Appendix A

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Professor Klein is an internationally recognized expert on antitrust economics, contractual arrangements, and industrial organization. He has extensive consulting and litigation experience and has made numerous presentations to state, federal and foreign regulatory agencies and courts. He has published widely, has taught at the Economics Institute for Federal Judges, and has served as a consultant to the U.S. Federal Trade Commission and the Antitrust Division of the U.S. Department of Justice.

Personal

Born 1943 in New York, N.Y.; married, three children.

Education

Ph.D., Economics, 1970, University of Chicago
M.A., Economics, 1967, University of Chicago
B.A., *cum laude*, Philosophy, 1964, Brooklyn College, CUNY

Employment

Professor of Economics, University of California, Los Angeles, 1978-present.
(Associate Professor, 1973-78; Assistant Professor, 1968-72.)

President, Economic Analysis Corporation, 1980-present.

Additional Current Positions:

> Director, Business Economics Program, Department of Economics, University of California, Los Angeles, 1996-present.
>
> Member, Executive Committee, College of Letters and Sciences, University of California, Los Angeles, 1992-94, 1996-present.
>
> Member, Board of Directors, Center for Research on Contracts and the Structure of Enterprise, University of Pittsburgh, 1991-present.

Member, ABA Intellectual Property Section, Committee on Antitrust Matters, 1996-present.

Member, Advisory Board of *The New Palgrave Dictionary of Economics and the Law*, 1995-present.

Member, Board of Editors:

Journal of Law, Economics & Organization, 1985-present
Supreme Court Economic Review, 1992-present
Journal of the Economics of Business, 1992-present
Journal of Corporate Finance, 1993-present
Managerial and Decision Economics, 1994-present

Past Positions:

Member, Board of Directors, Pilgrim Group of Mutual Funds, 1985-94.

Assistant Director, Business Economics Program, Department of Economics, University of California, Los Angeles, 1992-94.

Vice Chairman, Director of Graduate Studies, Department of Economics, University of California, Los Angeles, 1981-82, 1987-90.

Economics Director, University of California, Los Angeles joint degree in law and economics program, 1977-81.

Law and Economics Fellow, University of Chicago Law School, 1975-76, Fall 1979.

Visiting Professor, University of Washington, Spring 1979.

Research Associate, National Bureau of Economic Research, 1976-77.

Faculty Research Fellow, National Bureau of Economic Research, New York, 1971-72.

Economist, Executive Office of the President, Bureau of the Budget, Washington, D.C., Summer, 1966.

Areas of Specialization

Industrial Organization and Regulation; Antitrust Policy; Law and Economics of Contractual Arrangements; Pricing and Trade Practices; Economic Damage Estimation

Honors and Awards

Principal Investigator, Sloan Foundation Grant, Workshop in the Economics of Contractual Arrangements, 1981-91.

Faculty Sponsor, Earhart Foundation Fellowship, 1982-90.

University of Miami Law and Economics Center Annual Prize for Distinguished Scholarship in Law and Economics, 1978-79.

General Electric Law and Economics Fellowship, University of Chicago Law School Antitrust Project, 1978-79.

Scaiffe Foundation Law and Economics Fellowship, University of Chicago Law School, 1975-76.

Warren C. Scoville Distinguished Teaching Award, University of California, Los Angeles, Department of Economics, 1974, 1975.

Western Economic Association Annual Award for Best Article in *Economic Inquiry*, Journal of the Western Economic Association, 1975.

National Bureau of Economic Research Postdoctoral Research Fellowship, 1971-72.

Ford Foundation Dissertation Year Fellowship, University of Chicago, 1967-68.

University Fellowship, University of Chicago, 1965-67.

Professional Activities

Consultant: Department of Justice, Antitrust Division, 1994.

Federal Trade Commission, Bureau of Competition, 1983-86, 1988-89.

New Zealand Treasury, 1988.

Federal Trade Commission, Bureau of Consumer Protection, 1982-83.

Federal Trade Commission, evaluation of antitrust activity with regard to vertical distribution restrictions, 1976-80.

Various corporations and attorneys-at-law regarding antitrust, contracts and other commercial litigation, 1973-present.

Board of Governors of the Federal Reserve System, 1973, 1975.

Selected Speeches and Invited Panels:

"Kodak Meets the Facts: Trial of the Kodak Case", American Bar Association, Section of Antitrust Law, Annual Meeting, August 1996.

"Post-Chicago Economics: New Learning or Old Hat?", Los Angeles County Bar Association, May 1995.

"Intellectual Property and Antitrust", Antitrust and Trade Regulation Institute, Antitrust and Trade Regulation Law Section of the State Bar of California, October 1994.

"Competitive Implications of Franchise 'Encroachment' Protections", American Bar Association, Section of Antitrust Law, Annual Meeting, August 1994.

Lecturer:

Antitrust and Trade Regulation Institute, Antitrust and Trade Regulation Law Section of the State Bar of California, "Intellectual Property and Antitrust", 1994.

Practising Law Institute, 29th Annual Advanced Antitrust Seminar: Mergers, Markets and Joint Ventures, 1989.

Practising Law Institute, 27th Annual Advanced Antitrust Seminar: Mergers, Markets and Joint Ventures, 1987.

Practising Law Institute, Distribution and Marketing: The New Antitrust Environment, 1986.

Economics Institute for Federal Judges, Law and Economics Center, University of Miami School of Law, 1979-81.

Institute for Contemporary Studies - University of California, Los Angeles Graduate School of Management annual economics workshop for practicing antitrust attorneys, 1977-83.

Economics Institute for Law Professors, Law and Economics Center, University of Miami School of Law, 1979.

	University of California, Los Angeles, Graduate School of Management executive education program, 1981.
Referee:	For various economics and legal journals and for the National Science Foundation
Affiliations:	American Economic Association, Member, 1966-present American Law and Economics Association, Member, 1991-present American Bar Association, Associate Member, 1989-present

Testimony

Alaska Public Utilities Commission, in the Matter of the Application by Sadlerochit Pipeline Company for a Certificate of Public Convenience and Necessity, June 4, 1996 [pre-filed testimony], June 21, 1996 [direct testimony and cross examination, Anchorage].

Alaska Oil and Gas Conservation Commission, Petitions by ARCO Alaska, Inc. and BP Exploration (Alaska) Inc., April 4, 1996 [pre-filed testimony], April 10 and 13, 1996 [direct testimony and cross examination, Anchorage].

Shell Petroleum Mining Company Limited and Todd Petroleum Mining Company Limited v. Kapuni Gas Contracts Limited and Natural Gas Corporation of New Zealand Limited, High Court of New Zealand, Auckland Registry, March 20, 1996 [pre-filed testimony], May 11, 1996 [pre-filed reply testimony], June 26-27, 1996 [direct testimony and cross examination, Auckland, New Zealand].

Power New Zealand Limited v. Mercury Energy Limited and New Zealand Commerce Commission, High Court of New Zealand, June 12, 1995 and October 2, 1995 [pre-filed testimony], October 30-31, 1995 [direct testimony and cross examination, Auckland, New Zealand].

International Business Machines Corporation v. Fasco Industries, Inc., U.S. District Court for the Northern District of California, San Jose Division, Civil Case No. C-93-20326-RPA, April 5-6, 1995.

Art Buchwald, et al. v. Paramount Pictures Corporation, Superior Court of the State of California, County of Los Angeles, Civil No. C 706083, March 4, 1992.

Go-Video, Inc. v. Matsushita Electric Industrial Co., Ltd., et al., U.S. District Court, District of Arizona, Civil Action No. 87-0987 PHX RCB, May 23-24, 1991.

Southern California Edison-San Diego Gas & Electric merger before the California Public Utilities Commission. Rebuttal to DRA testimony, March 1990; rebuttal to intervenor testimony, May 1990; cross examination, July 25, 1990.

Fisher & Paykel Ltd. application under Section 62 of the New Zealand Commerce Act 1986. New Zealand Commerce Commission Hearing, Wellington, N.Z., August 29-September 2, 1988; testimony before the New Zealand High Court in proceedings brought by Simpson Appliance Ltd. and Email Ltd., Auckland, New Zealand, March 15-16, 1990.

Mobil Oil New Zealand and Her Majesty the Queen in Right of New Zealand, Arbitral Tribunal, Case ARB/87/2, International Centre for Settlement of Investment Disputes, World Bank, Washington D.C., November 9, 1988; Auckland, New Zealand, December 9, 1988.

Federal Trade Commission v. Detroit Auto Dealers Association et al., Docket No. 9189, U.S. Federal Trade Commission, Washington, D.C., July 16-17, 1986. [Portions under confidentiality order]

White Consolidated Industries, Inc. et al. v. Whirlpool Corp., et al., U.S. District Court, Northern District of Ohio, Eastern Division (Cleveland), Case No. C85-472, May 28-29, 1985. [Portions under confidentiality order]

Pennzoil Co. v. Texaco, Inc. et al., U.S. District Court, Northern District of Oklahoma (Tulsa), Case No. 84-C-29-E, February 3-4, 1984.

Deposition Testimony

In re Prudhoe Bay Unit Litigation, Superior Court of the State of Alaska, Third Judicial District at Anchorage. Case No. 3AN-95-8960 CI. December 20, 1996.

Alaska Public Utilities Commission, in the Matter of the Application by Sadlerochit Pipeline Company for a Certificate of Public Convenience and Necessity, June 14, 1996.

Preciado v. Abbott Laboratories, Superior Court of the State of California, County of San Francisco, Judicial Council Coordination Proceeding Nos. 2969, 2971 and 2972, May 10, 1995.

International Business Machines Corporation v. Fasco Industries, Inc., U.S. District Court for the Northern District of California, San Jose Division, Civil Case No. C-93-20326-RPA, January 26, 1995 and February 1, 1995.

Exxon Valdez Oil Spill Litigation, Superior Court for the State of Alaska, Third Judicial District, Civil Case No. 3-AN-89-2533 (municipalities litigation), October 21-22, 1993.

City of Long Beach and the State of California v. Chevron et al., U.S. District Court, Central District of California, MDL Docket No. 150 WPG, Civil Action No. CV 75-2232-WPG, February 21, 22 and 25, 1991 and March 31, 1992.

Art Buchwald, et al. v. Paramount Pictures Corporation, Superior Court of the State of California, County of Los Angeles, Civil No. C 706083, January 30, 1992 [Confidential]

Go-Video, Inc. v. Matsushita Electric Industrial Co., Ltd., et al., U.S. District Court, District of Arizona, Civil Action No. 87-0987 PHX RCB, October 29, 1990. [Under confidentiality order]

Cipollone v. Liggett Group, Inc. et al., U.S. District Court, District of New Jersey, Civil Action No. 83-2864 SA, July 15, 1987.

Digidyne v. Data General Corporation, U.S. District Court - Northern District of California, MDL Docket No. 369 MHP, June 17-19, 1987.

Salt Lake Auto/Truck Stop v. Union Oil of California, U.S. District Court, Central District of California Case No. 84 5772-PAR (JRx), October 21, 1986.

International Service Station Dealers Association v. Texaco, Inc. (Superior Court of the State of California, County of Los Angeles Case No. C391044, June 3, 1986). [Portions under confidentiality order]

Federal Trade Commission v. Detroit Auto Dealers Association et al., Docket/Case No. 9189, May 22, 1986 and June 11, 1986. [Portions under confidentiality order]

White Consolidated Industries, Inc. et al. v. Whirlpool Corp., et al., U.S. District Court, Northern District of Ohio, Eastern Division (Cleveland), Case No. C85-472, April 26, 1985.

Pennzoil Co. v. Texaco, Inc. et al., U.S. District Court, Northern District of Oklahoma (Tulsa), Case No. 84-C-29-E, January 28, 1984.

Affidavits and Declarations

Affidavit: In re Texaco Inc. Appeal of Order Dated September 5, 1996, United States Department of Interior, No. MMS-96-0424, March 12, 1997 [under seal].

Affidavit: Trans Alaska Pipeline System and Exxon Company, USA v. Amerada Hess Pipeline Company, et al., United States Federal Energy Regulatory Commission (Docket Nos. OR89-2-007 et al., OR96-14-000) and In re Formal Complaint of Tesoro Alaska Petroleum Company against Amerada Hess Pipeline Corporation et al., Alaska Public Utilities Commission (Docket Nos. P-89-1 et al.), January 28, 1997, February 14, 1997 and March 14, 1997 [reply affidavit].

Affidavit: Shell Petroleum Mining Company Limited and Todd Petroleum Mining Company Limited v. Kapuni Gas Contracts Limited and Natural Gas Corporation of New Zealand Limited, High Court of New Zealand, Auckland Registry, February 6, 1996.

Declaration: Preciado v. Abbott Laboratories, Superior Court of the State of California, County of San Francisco, Judicial Council Coordination Proceeding Nos. 2969, 2971 and 2972, April 24, 1995.

Declaration: Freeman McNeil, et al. v. National Football League, et al., Civil Action No. 4-90-476, and Reggie White, et al. v. National Football League, et al., Civil Action 4-92-906, U.S. District Court, District of Minnesota, Fourth Division, November 3, 1992 and November 20, 1992.

Declaration: Art Buchwald, et al. v. Paramount Pictures Corporation, Superior Court of the State of California, County of Los Angeles, Civil No. C 706083, January 30, 1992.

Affidavit: United States of America v. Loew's Incorporated, et al. (United States District Court, Southern District of New York, 89 Civ. 6159 (WCC)), November 6, 1991.

Affidavit: United States of America v. BNS Inc. (United States District Court for the Central District of California, Civil No. 88 01452R), April 4, 1988.

Affidavit: In the proposed merger of Goodman Fielder Limited and Wattie Industries Limited (The High Court of New Zealand, Administration Division, Wellington Registry, M264/87 and M280/87), July 29, 1987.

Declaration: Coastal Transfer Co. v. Toyota Motor Sales, U.S.A., Inc. (United States District Court, Central District of California Case No. 82-4635), November 25, 1985.

Declaration: State of California v. Texaco, Inc. et al. (Superior Court of the State of California, County of Sacramento, No. 321 706), August 20, 1984.

Affidavit: Federal Trade Commission v. Warner Communications Inc., et al. (United States District Court, Central District of California Civil No. 84-1506(R)), April 16, 1984. [Under seal]

Publications

"The Hold-Up Problem", *The New Palgrave Dictionary of Law and Economics*, Peter Newman (ed.), London: Macmillan (forthcoming 1998).

"Vertical Integration As A Self-Enforcing Contractual Arrangement", *American Economic Review Papers and Proceedings* (forthcoming, May 1997).

"Why 'Hold-Ups' Occur: The Self-Enforcing Range of Contractual Relationships", *Economic Inquiry*, Vol. 34, No. 3 (July 1996), pp. 444-463.

Reprinted in J. Lott (ed.), *Uncertainty and Economic Evolution* (London: Routledge, 1997), Chapter 4, pp. 61-84.

"Monopolization by 'Raising Rivals' Costs': The Standard Oil Case", *Journal of Law and Economics*, Vol. 39, No. 1 (April 1996), pp. 1-47.

"Market Power in Aftermarkets", *Managerial & Decision Economics*, special issue on The Role of Economists in Modern Antitrust, Vol. 17, No. 2 (March/April, 1996), pp. 143-164.

Reprinted in F. S. McChesney (ed.), *The Role of Economists in Modern Antitrust* (Wiley, 1997).

"The Economics of Franchise Contracts", *Journal of Corporate Finance*, Vol. 20, No. 1/2 (October 1995), pp. 9-37.

"Market Power in Antitrust: Economic Analysis after *Kodak*," *Supreme Court Economic Review*, Vol. 3 (1993), pp. 43-92.

"Brand Names," *Fortune Encyclopedia of Economics*, David R. Henderson (ed.), Time Warner Books, Inc., 1993, pp. 618-621.

"Contracts and Incentives: The Role of Contract Terms in Assuring Performance," invited paper at the Nobel Symposium on "Contracts: Determinants, Properties and Implications," August 1990 in Stockholm, Sweden. Proceedings published in *Contract Economics*, L. Werin and H. Wijkander (eds.), Basil Blackwell, 1992, pp. 149-172.

"Perfect Competition as a Criteria for Antitrust Policy: Brand Names, Entry Barriers and Exclusive Dealing in the Fisher & Paykel Case," in *Competition Law and Policy in New Zealand*, Rex Ahdar (ed.), Sydney: The Law Book Company Ltd., 1991, pp. 65-83.

"The Use of Economics in Antitrust Litigation: Realistic Models of the Competitive Process," in *The Law and Economics of Competition Policy*, F. Mathewson, M. Trebilcock and M. Walker (eds.), Vancouver, Canada: The Fraser Institute, 1990, pp. 419-441.

"The Competitive Consequences of Vertical Integration in the Cable Industry," submitted in Hearings before the U.S. Senate Committee on Commerce, Science and Transportation, June 21, 1989.

"An Economic Framework for Merger Analysis in New Zealand" (with Thomas J. Campbell), in *The Economics of the Commerce Act*, Alan Bollard (ed.), Auckland, New Zealand: New Zealand Institute of Economic Research, 1989, pp. 49-65.

"Vertical Restraints as Contract Enforcement Mechanisms" (with Kevin M. Murphy), *Journal of Law & Economics*, Vol. 31, No. 2 (October 1988), pp. 265-297.

Reprinted in *The Journal of Reprints for Antitrust Law and Economics*, Vol. 20, Federal Legal Publications (1990), pp. 291-325.

"Vertical Integration as Organizational Ownership: The Fisher Body-General Motors Relationship Revisited," *Journal of Law, Economics and Organization*, Vol. 4, No. 1 (Spring 1988), pp. 199-213.

Reprinted in: O. Williamson and S. Winter (eds.), *The Nature of the Firm: Origins, Evolution, and Development* (Oxford University Press, 1991), pp. 213-226; O. Williamson and S. Masten (eds.), *Transaction Cost Economics*, as part of the

International Library of Critical Writings in Economics, M. Blaug, series ed. (Edward Elgar Publishing Ltd., forthcoming); Scott Masten (ed.), *Case Studies in Contracting and Organization* (Oxford University Press, 1996).

"The Economics of Geographic Market Definition" in *27th Annual Advanced Antitrust Seminar: Mergers, Markets and Joint Ventures*, Practising Law Institute, Corporate Law and Practice, Course Handbook Series Number 581 (1987), pp. 255-276.

Revised and expanded version in *29th Annual Advanced Antitrust Seminar: Mergers, Markets and Joint Ventures*, Practising Law Institute, Corporate Law and Practice, Course Handbook Series Number 666 (1989), pp. 71-98.

"An Economic Analysis of Vertical Distribution and Marketing Arrangements," in *Distribution and Marketing: The New Antitrust Environment*, Practising Law Institute, Corporate Law and Practice, Course Handbook Series Number 511 (1986), pp. 131-144.

"Self-Enforcing Contracts," *Journal of Institutional and Theoretical Economics* (December 1985), pp. 594-600.

Reprinted in E.G. Furobotn and R. Richter (eds.), *The New Institutional Economics* (Texas A&M University Press, 1991), pp. 89-95.

"The Law and Economics of Franchise Tying Contracts" (with Lester Saft), *Journal of Law & Economics*, Vol. 28, No. 2 (May 1985), pp. 345-361.

"Study Protocol for Design of the Vertical Restraints Research Project," in *Impact Evaluations of Federal Trade Commission Vertical Restraints Cases*, R. N. Lafferty, R. H. Lande and J. B. Kirkwood (eds.), Federal Trade Commission Bureau of Competition and Bureau of Economics (August 1984), pp. 467-477.

"Contract Costs and Administered Prices: An Economic Theory of Rigid Wages," *American Economic Review Papers and Proceedings*, Vol. 74, No. 2 (May 1984), pp. 332-338.

"The Selection of Disputes for Litigation" (with George Priest), *Journal of Legal Studies*, Vol. 13, No. 1 (January 1984), pp. 1-55.

Reprinted in: Jules Coleman and Jeffrey Lange (eds.), *Law and Economics*, The International Library of Essays in Law & Legal Theory, New York University Press (1992), Vol. II, pp. 43-97; Steven A. Lippman and David K. Levine (eds.), *The Economics of Information*, The International Library of Critical Writings in Economics (Mark Blaug, series editor), Edward Elgar Publishing Ltd., forthcoming; Richard A. Posner and Francesco Parisi (eds.), *Law and Economics*, The International Library of Critical Writings in Economics (Mark Blaug, senior editor), Edward Elgar Publishing Ltd., forthcoming.

"The Economics of Block Booking" (with Roy Kenney), *Journal of Law & Economics*, Vol. 26, No. 3 (October 1983), pp. 497-540.

Reprinted in: R. E. McCormick (ed.), *Managerial Economics* (Prentice-Hall, forthcoming); O. E. Williamson and S. E. Masten (eds.), *Transaction Cost Economics*, as part of the *International Library of Critical Writings in Economics*, M. Blaug, series ed. (Edward Elgar Publishing Ltd., forthcoming).

"Contracting Costs and Residual Claims: The Separation of Ownership and Control," *Journal of Law & Economics*, Vol. 26, No. 2 (June 1983), pp. 362-374.

"Competing International Monies and International Monetary Arrangements" (with Michael Melvin), in M. Connelly, ed., *The International Monetary System: Choices for the Future* (New York, Praeger, 1983).

"Government Regulation of Cigarette Health Information" (with Lynne Schneider and Kevin Murphy), *Journal of Law and Economics*, Vol. 24, No. 3 (December 1981), pp. 575-612.

"The Role of Market Forces in Assuring Contractual Performance" (with Keith Leffler), *Journal of Political Economy*, Vol. 89, No. 4 (August 1981), pp. 615-641.

Reprinted in: O. Williamson (ed.), *Industrial Economics*, as part of the *International Library of Critical Writings in Economics*, M. Blaug, series ed. (Edward Elgar Publishing Ltd., 1993); Chen Yu (ed.), *Readings in Theory of Property Rights and Transaction Costs* (in Chinese), Shanghai Academy of Social Sciences, 1994; D. Klein (ed.), *Reputation: Studies in the Voluntary Enforcement of Good Behavior* (Ann Arbor: University of Michigan Press, (1997) pp. 281-304; Chen Yu (ed.), *The Institutions of the Firm and the Organizations of the Market* (Shanghai Joint Publishing Company, (1997).

"The Borderlines of Law and Economic Theory: Transaction Cost Determinants of 'Unfair' Contractual Arrangements," *American Economic Review Papers and Proceedings*, Vol. 70, No. 2 (May 1980), pp. 356-362.

Reprinted in: V. Goldberg, *Readings in Economic Analysis and the Law of Contracts* (Cambridge University Press, 1988); Chen Yu (ed.), *Institution of Firm and Organization of Market: Readings in Theory of Property Rights and Transaction Costs* (in Chinese), Shanghai Academy of Social Sciences, 1993; Richard Craswell and Alan Schwartz, *Readings on Contract Law* (Oxford University Press, 1993).

"Vertical Integration, Appropriable Rents and the Competitive Contracting Process" (with Armen Alchian and Robert Crawford), *Journal of Law and Economics*, Vol. 21, No. 2 (October 1978), pp. 297-326.

Reprinted in: M. C. Jensen and C. W. Smith, Jr. (eds.), *The Modern Theory of Corporate Finance* (McGraw-Hill, 1983); R. J. Gilson, *The Law and Finance of Corporate Acquisitions* (Foundation Press, 1986); J. B. Barney and W. G. Ouchi, *Organizational Economics* (Jossey-Bass, 1986); L. Putterman, *The Economic Nature of the Firm: A Reader* (Cambridge University Press, 1987); M. L. Burstein, *Studies* *in Banking Theory, Financial History and Vertical Control* (Macmillan Press Ltd., 1988); Z. Hanying, Beijing Management Institute (translator), Readings in Industrial Organization, forthcoming; Chen Yu (ed.), *Institution of Firm and Organization of Market: Readings in Theory of Property Rights and Transaction Costs* (in Chinese), Shanghai Academy of Social Sciences, forthcoming; Steven G. Medema (ed.), *The Legacy of Ronald Coase in Economic Analysis*, Edward Elgar Publishing Ltd., 1995; O. E. Williamson and S. E. Masten (eds.), *Transaction Cost Economics*, as part of the *International Library of Critical Writings in Economics*, M. Blaug, series ed. (Edward Elgar Publishing Ltd., forthcoming); O. Williamson and V. Katkalo (eds.), *Economics and Organization* (in Russian), St. Petersburg/USIA, forthcoming; S. Pejovich (ed.), *Readings in the Economics of Property Rights* (Edward Elgar Publishing Ltd., forthcoming).

"Competing Monies, European Monetary Union, and the Dollar," in M. Fratianni and T. Peeters (eds.), *One Money for Europe* (London: The MacMillan Press, 1978), pp. 69-94.

"The Measurement of Long and Short-Term Price Uncertainty: A Moving Regression Time Series Analysis", *Economic Inquiry*, Vol. 16, No. 3 (July 1978), pp. 438-452.

"Analise do Setor Monetario da Economia Brasileira" (with Ernani Teixeira), *Pesquisa e Planejamento Economico*, Vol. 8, No. 1 (April 1978), pp. 169-203.

"Money, Wealth and Seigniorage," in K. Boulding and T. F. Wilson (eds.), *Redistribution Through the Financial System: The Grants Economics of Money and Credit* (New York: Praeger Publishers, Inc., 1978), Chapter 1, pp. 3-19.

"Comments on Advertising," in A. Hyman and M. B. Johnson (eds.), *Advertising and Free Speech* (Lexington, Massachusetts: D. C. Heath and Company, 1977), pp. 96-97, 104-106.

"The Demand for Quality-Adjusted Cash Balances: Price Uncertainty in the U.S. Demand for Money Function," *Journal of Political Economy*, Vol. 85, No. 4 (August 1977), pp. 691-715.

"Competitive Interest Payments on Bank Deposits and the Long-Run Demand for Money: Reply," *American Economic Review*, Vol. 66, No. 5 (December 1976), pp. 958-960.

"Competing Monies: A Comment," *Journal of Money, Credit, and Banking*, Vol. 8, No. 4 (November 1976), pp. 513-519.

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"The Role of U.S. Multinational Corporations in Recent Exchange Crises," Center for Multinational Studies Occasional Paper, No. 6 (December 1974). Published in revised form as "Multinational Corporate Speculation During the Exchange Crises of 1971 and 1973," *Schweizerische Zeitschrift fur Volkswirtschaft und Stiitistik*, Heft 4/1976, pp. 562-592.

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"The Competitive Supply of Money," *Journal of Money, Credit, and Banking*, Vol. 6, No. 4 (November 1974), pp. 423-453.

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"On a Correct Measure of Inflation" (with Armen A. Alchian), *Journal of Money, Credit, and Banking*, Vol. 5, No.1 (February 1973), pp. 173-191.

Book Reviews

Did Monetary Forces Cause the Great Depression? by Peter Temin, Review, *Journal of Business*, Vol. 50, No. 2 (April 1977), pp. 244-248.

Competition and Entrepreneurship, by Israel Kirzner, Review, *Journal of Political Economy*, Vol. 83, No. 6 (December 1975), pp. 1305-1309.

The Channels of Monetary Effects on Interest Rates, by Phillip Cagan, Review, *Journal of Business*, Vol. 47, No. 1 (January 1974), pp. 94-96.

Section 3

Comments On Mineral Management Service's Notice of Proposed Rulemaking (NOPR) Establishing Oil Value for Royalty Due on Federal Leases

By Samuel A. Van Vactor
A Report Prepared for Texaco Inc.

I. Introduction

Crude oil pricing is complex by its nature. Crude oil quality, its density and level of contaminants, varies greatly from one region or field to another. Likewise, refineries vary in their ability to process different grades of crude oil. Moreover, the markets for petroleum products are in constant flux, both by geographic region and product type. As a consequence, relative petroleum product prices are constantly changing, and thus shifting the incentives to buy and sell the various grades of crude oil. The crude oil market responds to the shifting incentives; spot price assessments change every day and posted prices now change almost as frequently.[1]

The Mineral Management Service (MMS) proposal would calculate royalty obligation based on location-quality differentials tied to one of two index price series — for the West Coast, spot price assessments of Alaska North Slope (ANS) crude oil; and, for other regions, the New York Mercantile Exchange (NYMEX) West Texas Intermediate (WTI) price for the "prompt" month. In adopting this convention, the fundamental concept that guided MMS regulations for years — royalty obligations should be based on prices in the producing field — would be jettisoned, at least for integrated oil companies. The MMS proposes to substitute formula-based pricing for the present practice of market-based pricing at the lease. Such formulas would be arbitrary and unlikely to result in values that reflect arm's-length prices at the lease. Consequently, there is considerable risk that the basis on which royalties are calculated would deviate from fair market value. These deviations could be substantial.

To determine specific lease prices, the MMS proposes to adjust the index prices by "actual" transport costs (as defined by its regulations) and a confusing variety of location-quality adjustments. The MMS's proposal is inconsistent in methodology and application. California oil fields are treated differently from fields in the mid-continent. Independent producers are treated differently from integrated companies. The result would be a multi-track accounting procedure that would be costly, confusing and discriminatory among lessees.

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[1] Spot price assessments are estimates of various petroleum product and crude oil prices published by the trade press. They are based on a survey of traders and others involved in the marketing of petroleum. Posted prices are prices offered for various crude oil steams "posted" by various producers and refiners.

The two crude-oil index prices the MMS has chosen (WTI at Cushing and ANS crude oil delivered to the West Coast) are traded in large volumes. However, these crude oils are not necessarily representative of a general trend. Prices in other fields change frequently, often moving in opposite directions. This will compound the problem of determining location-quality differentials reflective of fair market value, creating uncertainty about crude-oil values in the producing fields.

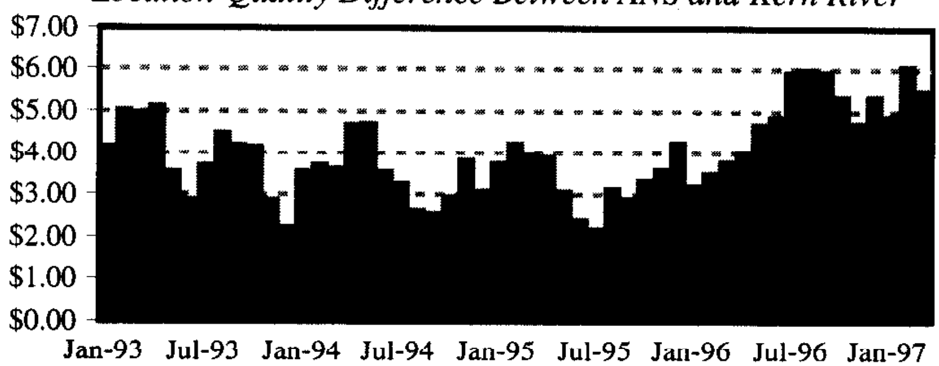
Theoretically, a formula based pricing system for crude oils would be able to approximate market value if all the proper adjustments could be made for costs, risks and the multitude of factors that underlie constantly shifting supply and demand schedules. However, such a system would have extremely high administrative costs for both the MMS and the industry (even if accurate information about such factors were available.) It would be costly to design and implement such a system since it would require, for example, that quality and location differentials for hundreds of crude oils be calculated on a monthly, if not daily basis. Net-back adjustments for a broad range of downstream costs and risks would be required. Annual calculation of these differentials, perhaps less costly to implement, could not possibly capture the workings of the market.

The uncertainty and valuation errors created by the MMS's proposed formulas would cause a number of economic inefficiencies. Prices do much more than simply determine what is paid for the crude oil; they signal producers to produce more or less. They signal where the crude oil ought to be shipped and whether refiners should run their plants at higher capacity or cut back. Ultimately the prices refiners are willing to pay for crude oil depend on the prices they expect to receive for the petroleum products they plan to refine. For example, if the market for Bunker C fuel oil is strong, and demand for gasoline and diesel is weak, refiners will seek to increase runs of heavy crude oil in order to produce the product in demand. When this happens, prices of heavy crude oil will be bid up, or the price of light crude oil will come down. Similarly, if demand for petroleum products declines in Chicago and increases in Houston, relative prices of Texas and Oklahoma crude oils will change and supplies will be redirected to refineries that need them.

The crude-oil market is anything but static, it is constantly changing. For example, Figure 1 illustrates the average monthly spot price differential between a Kern River, 13° API crude oil located in the San Joaquin Valley (SJV), California, and ANS, a 30° API crude oil delivered either to Los Angeles or the Bay Area of California.[2] Because Kern River is heavier and further from California's refineries it always sells for less than delivered ANS. However, the price difference varies enormously. In July 1995, ANS was $2.19 greater than Kern River; in February 1997 it was $6.08 per barrel greater. Similarly, ANS prices varied from $0.26 to $1.61 per barrel more than Line 63 crude oil, delivered to Los Angeles over the same period.[3]

In North America, the crude oil pricing structure has to account for the relative value of thousands of active crude oil fields at hundreds of pipeline junctions, aggregations points, market centers and refinery gates. How does it work? It is a decentralized process. Individual traders, who represent refiners, producers and/or marketers, make individual decisions. Every deal is different but in total the transactions aggregate to the crude oil market. Traders make their decisions based upon a vast array of market intelligence. No matter how skillfully designed, the workings of the market can not be reproduced by a set of simple formulas.

Figure 1
Location-Quality Difference Between ANS and Kern River



[2]Data used in figures are contained in attached Tables 1 and 2.

[3]Line 63 is a commingled stream of approximately 28 API of various California crude oils delivered to Los Angeles Basin refineries.

II. Specific problems with the MMS proposal

A. Abandoning the concept of fair market value

Replacing market-based pricing with formula-based pricing raises important philosophical, practical and legal issues. Both lessor and lessee should be concerned if the concept of payment on the basis of arm's-length prices in the producing fields is abandoned in favor of indices and formulas. Such formulas cannot reflect the day-to-day fluctuations in supply and demand in the field. Further, the results may be subject to manipulation and would lack the cross check of actual audits and verification of cash transactions.

B. Complexities of determining location-quality differentials

The MMS correctly understands that location differentials are not the same thing as transportation costs. They comment: "Although location differentials would reflect differences in the value of oil at different locations they are not transportation cost allowances."[4] However, after stating this principle, the MMS has almost completely ignored it. Instead, the methodology proposed is a combination of actual transport costs from the field to a variety of aggregation points and then differentials to market centers and to Cushing, Oklahoma. For the West Coast no differentials are proposed at all; instead ANS prices are to be adjusted for quality to make them "comparable" to the California crude oil in question and only estimated transport costs deducted.

The proposed procedure simply does not reflect how the market works. For example, the field price of Midway Sunset, a heavy crude oil produced in California's San Joaquin Valley is influenced by a number of factors that may be unique to that grade of oil in that field. Market value for royalties is set by what willing buyers and willing sellers pay for it at the lease. The correct location-quality differential between Midway Sunset and ANS is nothing more or less than the difference between the market prices of the two at their respective points of sale at any given time. It is impossible to accurately net back ANS values to the Midway Sunset field under the MMS's proposed formulas. Midway Sunset crude oil flows to local refineries in Bakersfield, north to Bay Area refineries, east to

[4]DOI, MMS 30 CFR Parts 206 and 208, p 3747.

Texas and south to Los Angeles. In virtually all cases the crude oil is commingled with a variety of other oils so that its specific properties can no longer be discerned. By itself, Midway Sunset cannot be shipped on an unheated crude oil pipeline, it has to be mixed with lighter crude oils. What constitutes transport cost or quality adjustment in this kind of system? Midway Sunset's delivered price may follow WTI one day and the next ANS or some other crude oil.

Appendix G of the NOPR contains an illustration of the MMS's methodology with respect to California crude oils. The royalty value for Midway Sunset was calculated using the average ANS spot price for September 1996, less a location quality-differential and transportation cost allowance.

Specifics on the calculation were not included by the MMS. However, questioning at the MMS's public hearing in Denver, Colorado on April 15, 1997, revealed that the location-quality adjustment was calculated using 1) the price-gravity adjustment for California crude oils published in posted-price bulletins applied to the gravity difference between Midway Sunset and ANS of 25¢ per degree amounting to $3.38, then 2) a sulfur penalty of 65¢, and then 3) transportation rates for the Four Corners Pipeline (a common carrier pipeline) between the SJV aggregation point and Long Beach refineries of 75¢ per barrel. MMS officials stressed that this calculation was for illustrative purposes only; actual numbers would change after their methodology was modified and improved.

Analysis of this information, however, shows that the MMS's proposed methodology (regardless of the actual numbers used) is arbitrary and unrelated to market value. During September 1996, Chevron's average posted price for Midway Sunset was $15.98. Kern River crude oil (the same gravity and similar location to Midway Sunset) spot prices from Reuters averaged $15.77 for the month. These prices (determined by buyers and sellers in or near the producing field) will match the "value" calculated by the MMS's index methodology only by accident. Some of the specific difficulties with the estimate contained in the NOPR include:

<u>ANS Prices</u>: The MMS used a spot ANS price of $21.25 for September, 1996. The source was not identified and it does not match average prices from either Reuters or British Petroleum (BP), although it is close. Most importantly, however, ANS spot prices are forward prices; they are negotiated in one month

for delivery in the next. In contrast, posted prices are contemporaneous; they are prices paid at the time of delivery. Deliveries of ANS in September 1996 were based on August spot prices. BP, the largest seller of ANS is explicit about its pricing methodology. Thus, BP's West Coast ANS price for delivery in September 1996 was $19.95 per barrel. (October deliveries, negotiated in September, were $21.70.) Using this ANS price of $19.95 applied to the MMS differential of $4.98 results in a royalty value of $14.97 per barrel, $1 below posted prices and 80¢ below spot prices for a similar crude oil in a nearby location.

The MMS also got the gravity of ANS wrong. Since production began at the Point McIntyre field on the North Slope and a second gas processing unit was added to Prudhoe Bay, average ANS gravity has increased to nearly 30°. Thus, ANS prices should have been discounted $4.13 for 16.5° of gravity difference, rather than $3.38 for 13.5° of difference. This point illustrates how difficult it is to successfully create a price formula. Things change all the time — the quality of the crude oil, transportation options, refinery configuration are just some of the factors affecting prices.

The MMS's most serious error concerns the application of California crude oil price-gravity differentials as a quality adjustment to ANS. Price-gravity differentials in posted price bulletins are meant to measure small variations around the gravity of the crude oil stream actually being delivered to the posting company. They are not intended to be applied across crude oil fields or for comparison to a wholly different crude oil. ANS is of much better refining quality than almost all California crude oils; it is lighter, more stable and predictable than commingled streams of California oils. ANS is delivered in large volumes and is not plagued by the heavy metals contained in most California crude oils. When ANS is compared to California crude oils of identical gravity using actual arm's length transactions or spot price assessments it typically sells for 50¢ to $1 per barrel more.

Sulfur Penalty: Similarly, the 65¢ per barrel sulfur penalty applied to Midway Sunset was inappropriate. There is less than one-tenth of one percent more sulfur in Midway Sunset than there is in ANS, thus 65¢ is much too high. (65¢ might, however, be too low when other quality differences are considered.) This issue underscores the difficulty in making these adjustments. There certainly is a sulfur penalty at work in the market for crude oil, but the approximate discount for each type of crude oil at any point in time is difficult to measure. There is no market information relating to sulfur that can readily be separated from other location and quality issues.

Transportation Cost Allowance: The MMS calculated a location differential of 75¢ per barrel between the aggregation point and ANS delivered to Los Angeles using pipeline transportation rates determined by the California PUC for the Four Corners Pipeline.[5] Unfortunately, such a shipment is not possible. Midway Sunset is approximately 13° and the Four Corners' system is unheated. In order to meet pipeline specifications the shipper must meet a minimum average of approximately 26°; to ship heavy crude oil on the pipeline it has to be blended with lighter crude oils or intermediate refinery products.

It is possible to ship heavy crude oil to Los Angeles by other means. Shell operates a unit train and heavy oils can always be shipped by tanker truck. These options, however, are about twice the cost of the pipeline rate for lighter crude oils. Blending costs and shipment of a commingled crude oil stream may sometimes be cheaper than train or truck. But such costs are very difficult to calculate. Further, serious difficulties exist in valuing the commingled crude oil stream once it reaches Los Angeles.

Market Differentials: The MMS netback approach involves an estimate of crude oil values in the field that starts with prices at market centers and works backwards, by subtracting transport and other costs. In certain cases such calculations would approximate market value at the lease and other times they would not. The Midway Sunset example selected by the MMS to explain its proposed rule is, itself, a perfect example of the inherent difficulties in the netback approach. Location-quality differentials cannot be accurately measured by "cost" calculations, because costs are only one part of the demand-supply equation that sets market value at the lease. What may be valid one month, could be completely irrelevant the next. As pointed out above, Midway Sunset crude oil flows to four different refinery centers: Which one, if any, sets the netback value?

The MMS proposes to collect location-quality differentials, average them

[5]There is only one heated pipeline from the SJV to Los Angeles. It is a proprietary line owned by Mobil and is not available to other producers or refiners.

for a year and publish them. Such a procedure completely overlooks the dynamic nature of the market. Figure 1 demonstrated the month-to-month variability in Kern River crude oil as compared to ANS.

Figure 2
Location-Quality Difference Between ANS and Line 63

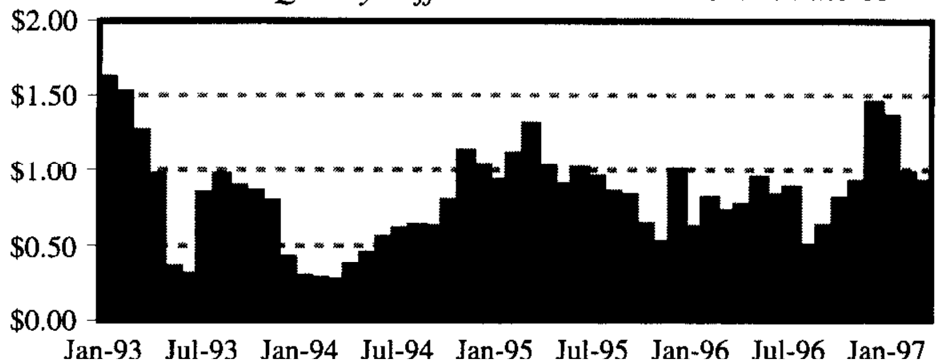


Figure 2 illustrates a similar variability between ANS and Line 63.

Figure 3
Location-Quality Difference Between WTI and ANS

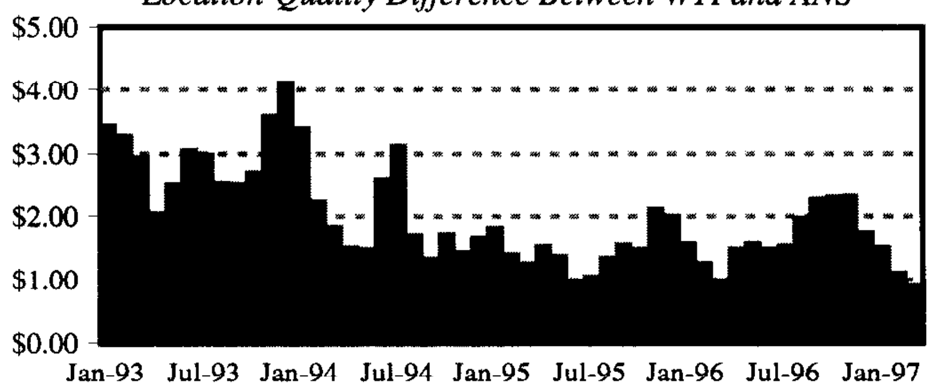
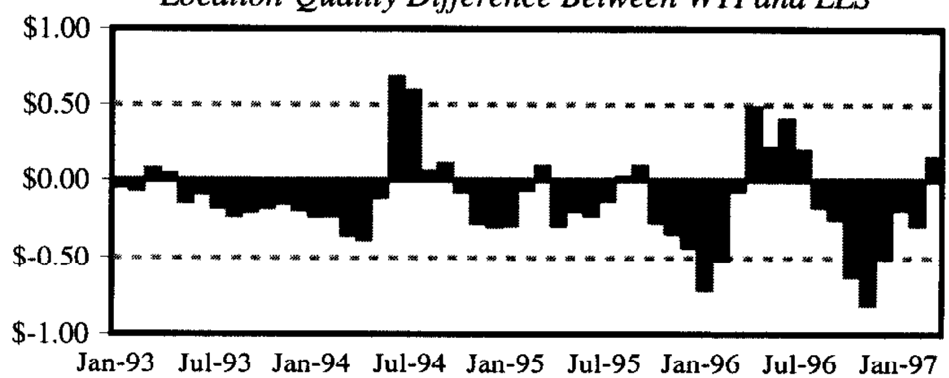


Figure 3 demonstrates the variability between ANS on the West Coast and WTI at Cushing, Oklahoma.

Figure 4 compares Louisiana Light at St. James (LLS), to WTI . The price differentials between these two crude oils are particularly revealing. On average WTI and LLS prices are about the same, but the differential is usually quite substantial and moves unpredictably; there is no apparent pattern. A similar result would be found for almost every other crude oil in the U. S. As noted above, there are virtually no public data on location-quality differentials. Thus, the MMS will have no cross check on the data submitted by royalty lessees.

Figure 4
Location-Quality Difference Between WTI and LLS



Part of the variability in location-quality differentials may be due to the idiosyncratic movements of ANS and WTI themselves. Stated another way, these prices are not necessarily reliable indicators of the general trend in crude oil prices. WTI prices at Cushing are particularly sensitive to the availability of inland pipelines and the specific refineries they serve. In contrast, ANS and most foreign crude oils are waterborne with a great many delivery options. ANS sales are, however, dominated by a single seller, BP. The monthly average of ANS prices has varied from $0.89 to $4.12 below WTI at Cushing over the last four years. Once again, these variations are quite unpredictable and are not captured by annual averages.

C. Inconsistencies in methodology and application

As noted above, two quite different procedures for determining field royalty values are being proposed for the West Coast and East-of-the-Rockies. As data are collected, there are likely to be many more deviations; as with the Midway Sunset example, it would not be surprising to discover that nearly every field is an exception. Further, the proposal suggests quite different standards for different companies. Those with integrated operations or those who trade crude oil, engaging in exchanges and other complex transactions, would be required to pay royalties on the basis of the index calculation. The concept of arm's-length sales prices would be retained only for certain independent producers. A dual standard is economically inefficient for the industry and likely to prove difficult and costly for the MMS to implement.[6]

D. Index prices are not representative.

The MMS has selected ANS spot prices as the index against which to gauge the value of California crude oils. This is problematic for several reasons. ANS is delivered to California refineries located at tidewater in Los Angeles or the Bay Area. It is a mid-gravity crude oil, with roughly 800 thousand barrels per day delivered to California. About half of the total goes to Exxon and ARCO refineries. These companies are ANS producers and generally refine their own crude oil. Remaining deliveries of ANS are sales and/or exchanges made by BP, Phillips and other ANS producers that do not have West Coast refineries.

Because ANS is waterborne and shipping costs from Valdez to Hawaii, Puget Sound and California are similar, ANS has a single price for West Coast deliveries. Generally spot ANS prices reported in the trade press are cited as differentials (discounts) from WTI at Cushing. The spot deals are tracked by

[6]Situations could arise where two producers were alike in all aspects excepting that one producer had purchased as well as sold oil sometime during the last two years. The basis on which the two lessees would pay royalties could be markedly different: one paying on the basis of a fixed differential from a moving index price, while the other paid on the basis of gross proceeds. Which of the two would be advantaged is unclear. What is clear is that the standard tax/royalty criterion that calls for equals to be treated equally would be violated.

Platts, Dow Jones, and Reuters and the resulting ANS spot price assessments are published. Generally, two to three cargos a week are sold spot and prices are updated after such sales.

There is some concern about the future liquidity of the ANS spot market, since it may now be exported. So far, foreign sales volume is limited, but this could change. In any case, the potential for exports has caused some ANS buyers to switch their preference to term contracts. Thus, the volume of spot sales could decline, reducing the reliability of spot prices for determining market value.

California crude oils are not as homogeneous as ANS. They vary widely in location, quality characteristics and transportation options. Most California crude oils are heavy and laden with metals and sulfur. As a consequence their prices are discounted relative to ANS or foreign imports. All large volume California fields — e.g., Kern River, Belridge, Midway Sunset, and Wilmington — produce heavy crude oils. Most offshore crude oils are not only heavy but contain high concentrations of sulfur. It takes a specialized refinery to process these crude oils. California has developed the most sophisticated refinery structure in the world with a high proportion of bottoms upgrading capacity in order to refine indigenous crude oils.

There are a limited number of heated crude-oil pipelines in California capable of moving the heavy crude oil. Most heavy oils are upgraded by intermediate refining or blending in order to be moved to refineries in Los Angeles or the Bay Area. Thus the process of determining transport costs for particular crude oils in particular fields is difficult, if not impossible.

Since 1993 ANS spot prices have averaged 82¢ per barrel higher than spot prices for Line 63. This 82¢ reflects a quality difference not captured by divergence in API gravity on average over the period and the MMS's proposed formulas. (Line 63 API gravity and sulfur content have been quite similar to ANS.) It is not possible to determine the fair market value of California crude oils based on ANS prices without taking into account such obvious arm's-length value differences. (The MMS has proposed to ignore this market-determined differential and to simply adjust ANS prices to a California crude oil equivalent based on gravity and sulfur differences.) Similar problems exist for crude oils in the mid-continent. WTI prices at Cushing are only indirectly related to prices in Louisiana, New Mexico, and Wyoming.

Table 1

Spot Prices Used For Comparison

	Kern River Spot	ANS West Coast Spot	Line 63 Spot	WTI-Cushing Spot	LLS Spot
Jan-93	$11.43	$15.59	$13.98	$19.03	$19.07
Feb-93	$11.78	$16.81	$15.30	$20.08	$20.15
Mar-93	$12.41	$17.38	$16.12	$20.32	$20.25
Apr-93	$13.10	$18.22	$17.26	$20.25	$20.22
May-93	$13.93	$17.46	$17.12	$19.95	$20.09
Jun-93	$13.18	$16.04	$15.75	$19.09	$19.17
Jul-93	$11.10	$14.79	$13.95	$17.77	$17.94
Aug-93	$10.96	$15.44	$14.48	$17.99	$18.22
Sep-93	$10.81	$15.01	$14.13	$17.50	$17.70
Oct-93	$11.29	$15.45	$14.60	$18.15	$18.33
Nov-93	$10.15	$13.02	$12.24	$16.61	$16.75
Dec-93	$8.17	$10.39	$9.98	$14.51	$14.70
Jan-94	$8.10	$11.64	$11.36	$15.03	$15.25
Feb-94	$8.87	$12.56	$12.30	$14.78	$15.00
Mar-94	$9.24	$12.86	$12.60	$14.68	$15.03
Apr-94	$10.23	$14.91	$14.55	$16.42	$16.80
May-94	$11.70	$16.41	$15.97	$17.89	$17.99
Jun-94	$12.92	$16.46	$15.91	$19.06	$18.39
Jul-94	$13.28	$16.54	$15.94	$19.65	$19.07
Aug-94	$14.06	$16.69	$16.06	$18.38	$18.34
Sep-94	$13.56	$16.11	$15.50	$17.45	$17.33
Oct-94	$13.06	$16.01	$15.22	$17.72	$17.79
Nov-94	$12.83	$16.64	$15.52	$18.07	$18.34
Dec-94	$12.41	$15.50	$14.47	$17.16	$17.45
Jan-95	$12.47	$16.21	$15.29	$18.03	$18.31
Feb-95	$12.94	$17.19	$16.08	$18.59	$18.65
Mar-95	$13.35	$17.29	$15.98	$18.54	$18.46
Apr-95	$14.48	$18.37	$17.34	$19.90	$20.18
May-95	$15.30	$18.37	$17.48	$19.74	$19.93
Jun-95	$15.07	$17.47	$16.47	$18.45	$18.67

Source: Reuters

Table 1

Spot Prices Used For Comparison

	Kern River Spot	ANS West Coast Spot	Line 63 Spot	WTI-Cushing Spot	LLS Spot
Jul-95	$14.08	$16.27	$15.33	$17.33	$17.45
Aug-95	$13.57	$16.70	$15.85	$18.04	$18.02
Sep-95	$13.78	$16.68	$15.86	$18.23	$18.14
Oct-95	$12.62	$15.96	$15.33	$17.43	$17.70
Nov-95	$12.30	$15.89	$15.38	$17.99	$18.33
Dec-95	$12.77	$17.03	$16.04	$19.03	$19.45
Jan-96	$14.08	$17.29	$16.68	$18.85	$19.56
Feb-96	$14.33	$17.83	$17.02	$19.09	$19.60
Mar-96	$16.57	$20.35	$19.63	$21.33	$21.40
Apr-96	$18.00	$22.01	$21.25	$23.50	$23.02
May-96	$14.89	$19.60	$18.66	$21.17	$20.95
Jun-96	$14.08	$18.95	$18.12	$20.42	$20.02
Jul-96	$13.82	$19.74	$18.86	$21.27	$21.07
Aug-96	$13.96	$19.94	$19.45	$21.90	$22.07
Sep-96	$15.77	$21.71	$21.09	$23.97	$24.21
Oct-96	$17.23	$22.58	$21.78	$24.88	$25.50
Nov-96	$16.68	$21.40	$20.49	$23.71	$24.51
Dec-96	$18.22	$23.57	$22.13	$25.31	$25.80
Jan-97	$18.73	$23.62	$22.27	$25.13	$25.31
Feb-97	$14.99	$21.07	$20.10	$22.18	$22.46
Mar-97	$14.58	$20.08	$19.17	$20.97	$20.81
Average 93	**$11.53**	**$15.47**	**$14.58**	**$18.44**	**$18.55**
Average 94	**$11.69**	**$15.19**	**$14.62**	**$17.19**	**$17.23**
Average 95	**$13.56**	**$16.95**	**$16.04**	**$18.44**	**$18.61**
Average 96	**$15.64**	**$20.41**	**$19.60**	**$22.12**	**$22.31**
Average	**$13.28**	**$17.28**	**$16.46**	**$19.27**	**$19.39**

Source: Reuters

Table 2

Differences Between Spot Prices

	ANS and Kern River	ANS and Line 63	WTI and ANS	WTI and LLS
Jan-93	$4.16	$1.61	$3.44	($0.04)
Feb-93	$5.03	$1.51	$3.27	($0.07)
Mar-93	$4.97	$1.26	$2.94	$0.07
Apr-93	$5.12	$0.96	$2.03	$0.03
May-93	$3.53	$0.34	$2.49	($0.14)
Jun-93	$2.86	$0.29	$3.05	($0.08)
Jul-93	$3.69	$0.84	$2.98	($0.17)
Aug-93	$4.48	$0.96	$2.55	($0.23)
Sep-93	$4.20	$0.88	$2.49	($0.20)
Oct-93	$4.16	$0.85	$2.70	($0.18)
Nov-93	$2.87	$0.78	$3.59	($0.14)
Dec-93	$2.22	$0.41	$4.12	($0.19)
Jan-94	$3.54	$0.28	$3.39	($0.22)
Feb-94	$3.69	$0.26	$2.22	($0.22)
Mar-94	$3.62	$0.26	$1.82	($0.35)
Apr-94	$4.68	$0.36	$1.51	($0.38)
May-94	$4.71	$0.44	$1.48	($0.10)
Jun-94	$3.54	$0.55	$2.60	$0.67
Jul-94	$3.26	$0.60	$3.11	$0.58
Aug-94	$2.63	$0.63	$1.69	$0.04
Sep-94	$2.55	$0.61	$1.34	$0.12
Oct-94	$2.95	$0.79	$1.71	($0.07)
Nov-94	$3.81	$1.12	$1.43	($0.27)
Dec-94	$3.09	$1.03	$1.66	($0.29)
Jan-95	$3.74	$0.92	$1.82	($0.28)
Feb-95	$4.25	$1.11	$1.40	($0.06)
Mar-95	$3.94	$1.31	$1.25	$0.08
Apr-95	$3.89	$1.03	$1.53	($0.28)
May-95	$3.07	$0.89	$1.37	($0.19)
Jun-95	$2.40	$1.00	$0.98	($0.22)

Source: Reuters

Table 2

Differences Between Spot Prices

	ANS and Kern River	ANS and Line 63	WTI and ANS	WTI and LLS
Jul-95	$2.19	$0.94	$1.06	($0.12)
Aug-95	$3.13	$0.85	$1.34	$0.02
Sep-95	$2.90	$0.82	$1.55	$0.09
Oct-95	$3.34	$0.63	$1.47	($0.27)
Nov-95	$3.59	$0.51	$2.10	($0.34)
Dec-95	$4.26	$0.99	$2.00	($0.42)
Jan-96	$3.21	$0.61	$1.56	($0.71)
Feb-96	$3.50	$0.81	$1.26	($0.51)
Mar-96	$3.78	$0.72	$0.98	($0.07)
Apr-96	$4.01	$0.76	$1.49	$0.48
May-96	$4.71	$0.94	$1.57	$0.22
Jun-96	$4.87	$0.83	$1.47	$0.40
Jul-96	$5.92	$0.88	$1.53	$0.20
Aug-96	$5.98	$0.49	$1.96	($0.17)
Sep-96	$5.94	$0.62	$2.26	($0.24)
Oct-96	$5.35	$0.80	$2.30	($0.62)
Nov-96	$4.72	$0.91	$2.31	($0.80)
Dec-96	$5.35	$1.44	$1.74	($0.49)
Jan-97	$4.89	$1.35	$1.51	($0.18)
Feb-97	$6.08	$0.97	$1.11	($0.28)
Mar-97	$5.50	$0.91	$0.89	$0.16
Average 93	**$3.94**	**$0.89**	**$2.97**	**($0.11)**
Average 94	**$3.51**	**$0.58**	**$2.00**	**($0.04)**
Average 95	**$3.39**	**$0.92**	**$1.49**	**($0.17)**
Average 96	**$4.78**	**$0.82**	**$1.70**	**($0.19)**
Average	**$4.00**	**$0.82**	**$1.99**	**($0.13)**

Source: Reuters

Section 4

PARTICIPANTS & TRANSACTIONS IN

THE CRUDE OIL MARKET AT THE LEASE IN TEXAS

Robert B. Bossung
Solomon Associates, Inc.

May, 1997

PARTICIPANTS & TRANSACTIONS IN THE CRUDE OIL MARKET

AT THE LEASE IN TEXAS

A review of records maintained by the State of Texas shows the existence of a highly active, competitive market for crude oil at the lease. The data shows thousands of transactions each month involving hundreds of thousands of barrels sold each day in arm's-length transactions between parties with opposing economic interests.

This paper describes the crude oil market at the lease in Texas for a representative month - December 1995. While this is a snapshot in time, the market structure described herein is believed representative of the market structure at the lease which has existed for decades.

Dimensions Of the Crude Market In Texas

The crude oil market at the lease in Texas is very large in terms of volume as well as number of participants. Figure A is a schematic which represents this market. The market at the lease is between the producer/seller and the First Purchaser. There are currently over six thousand producers and about one hundred fifty First Purchasers in Texas. Producers, as well as the First Purchasers, are comprised of refiners and non-refiners. Most of the oil produced in the State is produced by non refiners while, at the lease, most is purchased by refiners and/or their affiliates. In most instances, this oil is transported to and run in their refineries. Some oil, about 17%, is purchased at the lease by non-refiners and taken to a reseller market, usually remote from the lease, for subsequent resale to another reseller or to a refiner. Eventually, of course, all barrels wind up being sold to or run by a refiner.

Dimensions Of the Crude Market At the Lease

An excellent source of data on lease transactions is maintained by the State of Texas Comptroller's Office and is known alternatively as the "First Purchaser Database" or the "10-132 Database". This database provides a record of transactions between the producers and First Purchasers by month and is maintained to assure that the Severance and Regulatory Tax is paid on all oil produced and removed from the lease. The records in the database are used to compare what the producers report with what the First Purchasers report. Data extracted from December 1995, a randomly selected month, is discussed herein.

This data was inserted into a database to sort arm's-length and potentially non arm's-length transactions. Of course, refiners and their affiliates are the predominate buyers at the lease. First, transactions between the producing and refining or trading affiliates of the same company were classified as non-arm's-length. In addition, however, for the purpose of this analysis, several additional and very conservative assumptions were made as follows: 1) sales between any refiner/producer and any other refiner/First Purchaser were classified as non- arm's-length transactions; and, 2) the three large trucker resellers, i.e., Koch, Texaco Trading and Transportation, Inc. and Scurlock Permian, while performing mainly in a reseller function were also classified as refiners insofar as they were affiliates of refiners. Thus, for example, Scurlock Permian purchases from all producers affiliated with refiners were excluded even though these transactions are clearly arm's-length. Ashland/Scurlock is not a producer and in December 1995, Ashland (Scurlock's parent) sold no barrels at the lease to Scurlock.

FIGURE A

SCHEMATIC SHOWING CRUDE OIL MARKETS

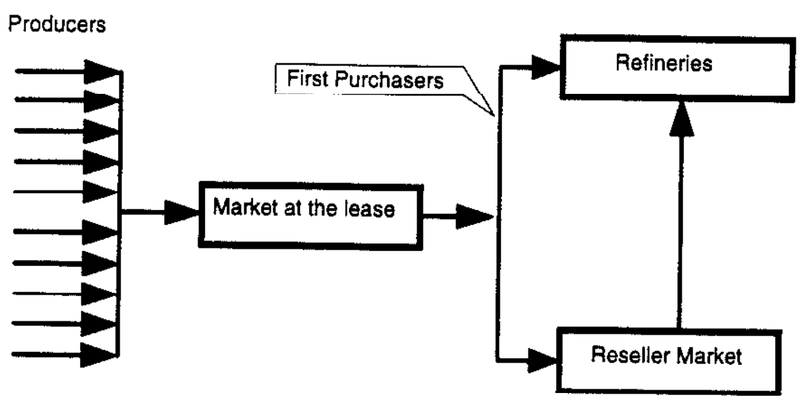
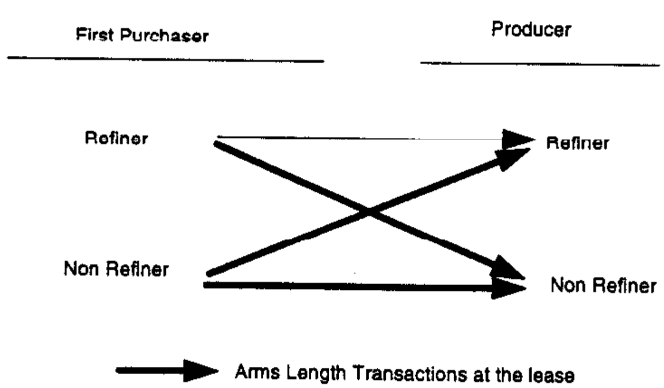


FIGURE B

MARKET PARTICIPANTS AT THE LEASE



Only the remainder of the transactions were considered to be arm's-length for purposes of this paper, i.e., sales by purely independent producers as well as sales by refiner/producers to purely independent traders.

The first step in analyzing this First Purchaser database was to classify each First Purchaser and each producer as a refiner or a non-refiner. The producer classification is displayed in Table 1. Thirty-three refiner/producers were identified. The other producers, over 6,200, were classified as non-refiners.

The First Purchaser classification is presented in Table 2. As can be seen from the Table, one hundred fifty active First Purchasers were identified in December 1995. Each such purchaser was classified as either:

R	=	Refiner (or an affiliate of a refiner)
NR	=	Non-Refiner
NRPP	=	Non-Refiner purchaser buying own or an affiliate's oil

Once this was done, it was possible to partition the Form 10-132 line item entries relating to the December 1995 crude oil market between refiners and non-refiners and calculate: a) the fraction of the total volume produced which was sold in arm's-length transactions as defined above; and, b) the number of line item entries involved in each set or grouping of the above sales.

The line item entries must be defined in the context of the Controller's First Purchaser Report. Form 10-132 requests all barrels sold in a month (not number of separate sales transactions) between a producer and a First Purchaser in a county. Thus, if a producer sold the oil from three leases to a particular First Purchaser in a particular county, there would be only one line item entered on the form displaying total barrels in that county, the average price, which party is assuming the tax liability, etc. Thus, the word line item, as used in this context, stands for the set of transactions between a producer and a buyer in a single county in a single month.

In December 1995, there were a total of 12,227 line item entries for all counties in the State of Texas. According to the Railroad Commission, in January 1996, there were 60,615 active leases in Texas. Thus on the average, each of these line items represented 60,615/12,226 = 4.96 leases and presumably separate commercial transactions for each of these leases.

TABLE 1

LIST OF REFINER/PRODUCERS DECEMBER 1995

#	PRODUCER	TYPE(1)	MB/D
1	AMOCO PRODUCTION CO.	R	128.27
2	TEXACO E&P INC	R	80.71
3	EXXON CORP.	R	79.39
4	CHEVRON USA	R	65.55
5	SHELL WESTERN E&P	R	51.47
6	MARATHON OIL CO.	R	43.82
7	MOBIL PRODUCING TX & NM	R	38.35
8	ATLANTIC RICHFIELD COMPANY	R	38.29
9	AMERADA HESS	R	31.93
10	CONOCO INC	R	29.53
11	UNION OIL CO OF CALIFORNIA	R	29.23
12	HUNT OIL CO	R	28.17
13	PENNZIOL E AND P	R	19.75
14	PHILLIPS PETROLEUM CO	R	19.47
15	FINA OIL AND CHEMICAL CO	R	9.90
16	SHELL LAND AND ENERGY	R	8.69
17	MVP PRODUCTION	R	6.55
18	COASTAL OIL AND GAS	R	2.45
19	VASTAR	R	2.41
20	MURPHY E&P COMPANY	R	1.70
21	SHELL FRONTIER O & G	R	1.65
22	HOWELL PETE	R	0.37
23	PLACID OIL	R	0.36
24	HOLLYPETE	R	0.27
25	PETRO HUNT CORP	R	0.07
26	PETROSOURCE	R	0.02
27	SINCLAIR EXP CO	R	0.02
28	COASTAL STATES TRADING	R	0.01
29	PRIDE EXP	R	0.01
30	SCURLOCK PERMIAN CORP.	R	0.01
31	HESS PROD	R	0.01
32	HUNT PETE CORP	R	0.01
33	SUN COMPANY INC (R&M)	R	0.01
			718.42

TABLE 2
LIST OF FIRST PURCHASERS DECEMBER 1995

#	FIRST PURCHASER	CLASS(1)	MB/D	% OF TOTAL
1	AMOCO PRODUCTION CO.	R	142.96	9.6
2	TEXACO TRADING & TRANSPORTATION INC.	R	109.73	7.4
3	SCURLOCK PERMIAN CORP.	R	108.88	7.3
4	PHILLIPS	R	101.42	6.8
5	MOBIL OIL CORP.	R	97.57	6.6
6	EXXON CORP.	R	96.07	6.5
7	KOCH INDUSTRIES	R	72.29	4.9
8	SHELL OIL COMPANY	R	53.82	3.6
9	MARATHON OIL CO.	R	51.75	3.5
10	EOTT OPERATING LP	NR	50.42	3.4
11	BASIS PETROLEUM	R	48.32	3.3
12	CHEVRON USA	R	48.02	3.2
13	FINA OIL AND CHEMICAL CO	R	47.73	3.2
14	CONOCO INC	R	40.61	2.7
15	SUN COMPANY INC (R&M)	R	38.07	2.6
16	CITGO PETROLEUM	R	30.93	2.1
17	UNION PACIFIC FUELS	NRPP	29.08	2.0
18	ATLANTIC RICHFIELD COMPANY	R	26.36	1.8
19	ORYX CRUDE T&T	NRPP	24.21	1.6
20	PRIDE COMPANIES	R	21.43	1.4
21	UNION OIL CO OF CALIFORNIA	R	17.99	1.2
22	LANTERN PETROLEUM CORP.	NR	17.17	1.2
23	PENNZOIL GAS MARKETING COMPANY	R	16.88	1.1
24	GULFMARK ENERGY INC.	NR	14.82	1.0
25	AMERADA HESS	R	13.49	0.9
26	BURLINGTON RESOURCES TRADING INC.	NRPP	9.71	0.7
27	PLAINS MKT & TRANS.	NR	9.68	0.7
28	SANTA FE ENERGY RESOURCES	NRPP	9.61	0.6
29	MESA PIPELINE CO.	NR	9.41	0.6
30	TOTAL PETROLEUM	R	7.81	0.5
31	WICKFORD ENERGY	NR	7.79	0.5
32	COASTAL STATES TRADING	R	6.79	0.5
33	NORTH RIDGE ENERGY MKT.	NR	6.48	0.4
34	HOWELL CRUDE OIL CO.	R	6.44	0.4
35	MURPHY OIL	R	5.95	0.4
36	BHT MARKETING	NR	5.72	0.4
37	ADA CRUDE OIL COMPANY	NR	5.48	0.4
38	TEXON	NR	5.47	0.4
39	NAVAJO CRUDE OIL MARKT CO	R	4.50	0.3
40	EAST TEX CRUDE OIL	NR	4.37	0.3
41	VASTAR	R	3.99	0.3
42	HIGHLAND ENERGY CO.	NR	3.42	0.2
43	DORADO OIL COMPANY	NRPP	3.34	0.2
44	GEER TANK TRUCKS	NR	3.25	0.2
45	MEREDITH MKT. CO.	NR	3.20	0.2
46	BIG TEX CRUDE OIL CO.	NR	3.20	0.2
47	DIAMOND SHAMROCK	R	3.17	0.2
48	NORCO CRUDE GATHERING	NR	2.32	0.2
49	FALCO S&P	NR	2.05	0.1
50	GREAT WESTERN MKT INC.	NRPP	2.03	0.1
51	LEXAS OIL	NR	1.74	0.1

TABLE 2
LIST OF FIRST PURCHASERS DECEMBER 1995

#	FIRST PURCHASER	CLASS(1)	MB/D	% OF TOTAL
52	MURPHY E&P COMPANY	R	1.67	0.1
53	OASIS PARTNERS LTD.	NR	1.67	0.1
54	VISION RESOURCES	NR	1.38	0.1
55	ATLAS PROCESSING COMPANY	R	1.27	0.1
56	NAVAJO REFINING CO	R	1.07	0.1
57	W.T. WAGGONER ESTATE	NRPP	1.05	0.1
58	MAYNARD OIL	NRPP	1.02	0.1
59	PETROSOURCE	R	0.98	0.1
60	SUPERIOR CRUDE GATHERING	NR	0.93	0.1
61	PANENERGY	NR	0.92	0.1
62	THE MORE GROUP	NR	0.88	0.1
63	VINTAGE MARKETING	NRPP	0.80	0.1
64	L&L INC.	NR	0.77	0.1
65	US FUELS INC.	NR	0.76	0.1
66	KGF SALES CO.	NR	0.72	0.1
67	LA GLORIA	R	0.71	0.0
68	NATIONAL COOPERATIVE REFINERY ASSOC	R	0.68	0.0
69	PLACID REFINING CO.	R	0.62	0.0
70	QUANTUM TRADING CO.	NR	0.60	0.0
71	US TRADING & TRANSPORTATION	NR	0.50	0.0
72	SENEX PL CO.	NR	0.49	0.0
73	LION OIL	R	0.49	0.0
74	BRIGHT & BIVINS PETROLEUM	NR	0.48	0.0
75	BRYAN WOOBINE GATHERING	NR	0.47	0.0
76	IPM CORP.	NR	0.42	0.0
77	JENEX OPERATING CO.	NRPP	0.41	0.0
78	CENTRAL CRUDE INC.	NR	0.41	0.0
79	STRATUM GROUP	NR	0.41	0.0
80	STATEWIDE CRUDE INC.	NRPP	0.40	0.0
81	OASIS OIL CORP.	NR	0.39	0.0
82	NGC OIL TRADING	NR	0.37	0.0
83	GATHERING & ENERGY MKT CO.	NR	0.35	0.0
84	TORCH ENERGY	NRPP	0.33	0.0
85	MOBIL PRODUCING TX & NM	R	0.26	0.0
86	E&A OIL CO.	NR	0.25	0.0
87	ALLIED CRUDE PURCHASING	NR	0.24	0.0
88	JN PETROLEUM MKT.	NRPP	0.24	0.0
89	INDEPENDENT ENERGY	NR	0.23	0.0
90	C&C OPERATING INC.	NRPP	0.20	0.0
91	JOHN L. COX	NRPP	0.18	0.0
92	ENPRO	NR	0.18	0.0
93	TEXAS OIL & GATHERING	NR	0.18	0.0
94	SHELL WESTERN E&P	R	0.18	0.0
95	TEXPATA PL CO.	NR	0.16	0.0
96	MIDLAND CRUDE OIL PURCHASING CORP.	NRPP	0.15	0.0
97	R&K COMPANY	NRPP	0.15	0.0
98	DEVON MARKETING CORP.	NR	0.15	0.0
99	AMERICAN TRANSPORTATION & MKT	NR	0.14	0.0
100	MITCHELL GAS SERVICES INC.	NRPP	0.14	0.0
101	HUNT REFINING CO	R	0.13	0.0
102	TEXACO E&P INC	R	0.13	0.0

TABLE 2
LIST OF FIRST PURCHASERS DECEMBER 1995

#	FIRST PURCHASER	CLASS(1)	MB/D	% OF TOTAL
103	VULCAN ENERGY GROUP	NR	0.13	0.0
104	AGE REFINING INC	R	0.12	0.0
105	BLANK	NR	0.11	0.0
106	DAVID THALMANN VACUUM SERVICE	NR	0.09	0.0
107	CENTRAL CRUDE CORP.	NR	0.09	0.0
108	CHAMPION TRANSPORT INC.	NR	0.08	0.0
109	BERRY PETROLEUM	NR	0.08	0.0
110	CALUMET LUBRICANTS CO	R	0.07	0.0
111	BLACK GOLD TRADING CO.	NRPP	0.07	0.0
112	LITTLE INCH PL COMPANY	NR	0.06	0.0
113	WILLIAMS ENERGY	NR	0.06	0.0
114	CONTINENTAL ORZARK	NRPP	0.06	0.0
115	MARTIN GAS SALES	NR	0.05	0.0
116	SO TEXAS GATHERING CO.	NRPP	0.04	0.0
117	CARDINAL PIPELINE CORP.	NR	0.04	0.0
118	ANDREWS OIL BUYERS INC	NR	0.04	0.0
119	DOT OIL CORP.	NRPP	0.04	0.0
120	BARGAS	NRPP	0.03	0.0
121	LASAR GATHERING CORP.	NR	0.03	0.0
122	COAST ENERGY GROUP	NR	0.03	0.0
123	ENRON	NR	0.03	0.0
124	BLS RESOURCES	NRPP	0.02	0.0
125	ADAIR TRANSPORT	NRPP	0.02	0.0
126	LEBUS OIL FIELD SERVICE	NRPP	0.02	0.0
127	QUITMAN CONSTRUCTION CO.	NRPP	0.02	0.0
128	WILLIAMS SYSTEMS OIL FIELD DISPOSAL	NRPP	0.02	0.0
129	GIBTOWN	NR	0.02	0.0
130	LANGHAM PETROLEUM EXP. CO.	NRPP	0.02	0.0
131	MIDWESTERN RECLAMATION	NRPP	0.01	0.0
132	WARFIELD PROPERTIES	NR	0.01	0.0
133	T S T PARAFFIN SERV. CO	NRPP	0.01	0.0
134	INTERSTATE PETE CORP.	NR	0.01	0.0
135	PANTHER & BRYANT SALT WATER	NRPP	0.01	0.0
136	FOXX TRANSPORTS	NR	0.01	0.0
137	CORNELIAN RECLAIMING	NRPP	0.01	0.0
138	WOODLAWN PIPELINE	NR	0.01	0.0
139	HYDROCARBON PROCESSING PARTNERS	NR	0.01	0.0
140	ANDRUS PIPELINE	NRPP	0.01	0.0
141	ROAD OIL SALES	NR	0.01	0.0
142	BRYANT SALT WATER DISPOSAL	NRPP	0.01	0.0
143	FORMOSA HYDROCARBONS	NR	0.00	0.0
144	LENNON OIL	NRPP	0.00	0.0
145	OILCO ENERGH CO	NR	0.00	0.0
146	RICE ENGINEERING	NRPP	0.00	0.0
147	AMIGO DIVERSIFIED SERVICES	NRPP	0.00	0.0
148	JACK FROST PURCHASING	NR	0.00	0.0
149	SINK-HOLE INC.	NRPP	0.00	0.0
150	UMC PETROLEUM CORP.	NR	0.00	0.0
			1,486.29	100.0

Table 3 displays the pertinent volume and transaction figures for each of the two sets of market participants, i.e., refiners and non-refiners.

Table 3
PARTITION OF VOLUMES & LINE ITEM ENTRIES
December 1995

	Volume, MB/D		No. Of Line Items	
	Producers	First Purchasers	Producers	First Purchasers
Refiners	718	1,231	957	8,913
Non Refiners	767	254	11,270	3,314
Total	1,486	1,486	12,227	12,227

Non-refiners produced 767 MB/D equivalent to 52% of the total volume while refiners purchased 1,230 MB/D at the lease or 83% of the total. The number of line items during this month, while believed to be typical, was huge at 12,227. In addition, on the average, each of these "summary" line items represents about five leases or separate commercial transactions between the producer and the First Purchaser. The non-refiners or independent producers had 11,270 line item entries during the month, equivalent to 92% of the transactions and 52% of the volume.

Table 4 shows the number of line item entries involving arm's-length transactions based on the conservative assumptions described above. It shows that of the 12,227 line item entries for the State of Texas (all counties) in December 1995, 11,236 entries involved one or more arm's-length transactions using these conservative assumptions.

Table 4
ARM's- LENGTH LINE ITEM ENTRIES
December 1995

Producer to First Purchaser	Volume MB/D	Volume %	Line Items Number	Line Items %
Refiners to non-refiners	21	1.4	90	0.7
Non-refiners to refiners	534	35.9	8,046	65.8
Non-refiners to non-refiners(1)	171	11.5	3,100	25.4
Total, Arm's-Length	726	48.8	11,236	91.9
Total, All Line Items	1,486	100.0	12,227	100.0

(1) These figures do not include non-refiner/purchasers of an affiliate's oil. For example, it does not include Union Pacific Fuels purchases of their parent's production. See Table 5 for a list of these excluded line items.

TABLE 5

NON REFINER PURCHASES OF OWN/AFFILIATE PRODUCTION
DECEMBER 1995

#	FIRST PURCHASER	CLASS	MB/D	% of STATE
1	UNION PACIFIC FUELS	NRPP	28.79	1.9
2	ORYX CRUDE T&T	NRPP	19.06	1.3
3	SANTA FE ENERGY RESOURCES	NRPP	9.61	0.6
4	MAYNARD OIL	NRPP	1.02	0.1
5	VINTAGE MARKETING	NRPP	0.80	0.1
6	GREAT WESTERN MKT INC.	NRPP	0.46	0.03
7	JENEX OPERATING CO.	NRPP	0.41	0.03
8	TORCH ENERGY	NRPP	0.33	0.02
9	JN PETROLEUM MKT.	NRPP	0.21	0.01
10	C&C OPERATING INC.	NRPP	0.20	0.01
11	W.T. WAGGONER ESTATE	NRPP	0.19	0.01
12	JOHN L. COX	NRPP	0.18	0.01
13	MIDLAND CRUDE OIL PURCHASING CORP.	NRPP	0.15	0.01
14	R&K COMPANY	NRPP	0.15	0.01
15	MITCHELL GAS SERVICES INC.	NRPP	0.14	0.01
16	CONTINENTAL ORZARK	NRPP	0.06	0.004
17	BURLINGTON RESOURCES TRADING INC.	NRPP	0.05	0.003
18	DORADO OIL COMPANY	NRPP	0.05	0.003
19	SO TEXAS GATHERING CO.	NRPP	0.04	0.003
20	DOT OIL CORP.	NRPP	0.04	0.002
21	BARGAS	NRPP	0.03	0.002
22	BLS RESOURCES	NRPP	0.02	0.002
23	ADAIR TRANSPORT	NRPP	0.02	0.001
24	LEBUS OIL FIELD SERVICE	NRPP	0.02	0.001
25	QUITMAN CONSTRUCTION CO.	NRPP	0.02	0.001
26	WILLIAMS SYSTEMS OIL FIELD DISPOSAL	NRPP	0.02	0.001
27	LANGHAM PETROLEUM EXP. CO.	NRPP	0.02	0.001
28	MIDWESTERN RECLAMATION	NRPP	0.01	0.001
29	T S T PARAFFIN SERV. CO	NRPP	0.01	0.001
30	STATEWIDE CRUDE INC.	NRPP	0.01	0.001
31	PANTHER & BRYANT SALT WATER	NRPP	0.01	0.001
32	CORNELIAN RECLAIMING	NRPP	0.01	0.001
33	BLACK GOLD TRADING CO.	NRPP	0.01	0.000
34	ANDRUS PIPELINE	NRPP	0.01	0.000
35	BRYANT SALT WATER DISPOSAL	NRPP	0.01	0.000
36	LENNON OIL	NRPP	0.005	0.000
37	RICE ENGINEERING	NRPP	0.004	0.000
38	AMIGO DIVERSIFIED SERVICES	NRPP	0.003	0.000
39	SINK-HOLE INC.	NRPP	0.001	0.000
			62.18	4.2

Top Twenty First Purchasers In Texas

An alternative way to look at the make up of the Texas crude oil market at the lease is to examine the purchases of the larger First Purchasers.

In this case, the top twenty First Purchasers were selected. Their identity is shown across the bottom of Figure C. These twenty purchased 1,240 MB/D or 85.0% of the state total in December 1995. The purchasers range in size from No. 1, Amoco Production Company at 143.0 MB/D, to No. 20, Pride Companies at 21.4 MB/D. Their collective purchases have been classified into three categories as shown in Table 6.

Table 6
PARTITION OF TOP TWENTY FIRST PURCHASERS PURCHASES
December 1995

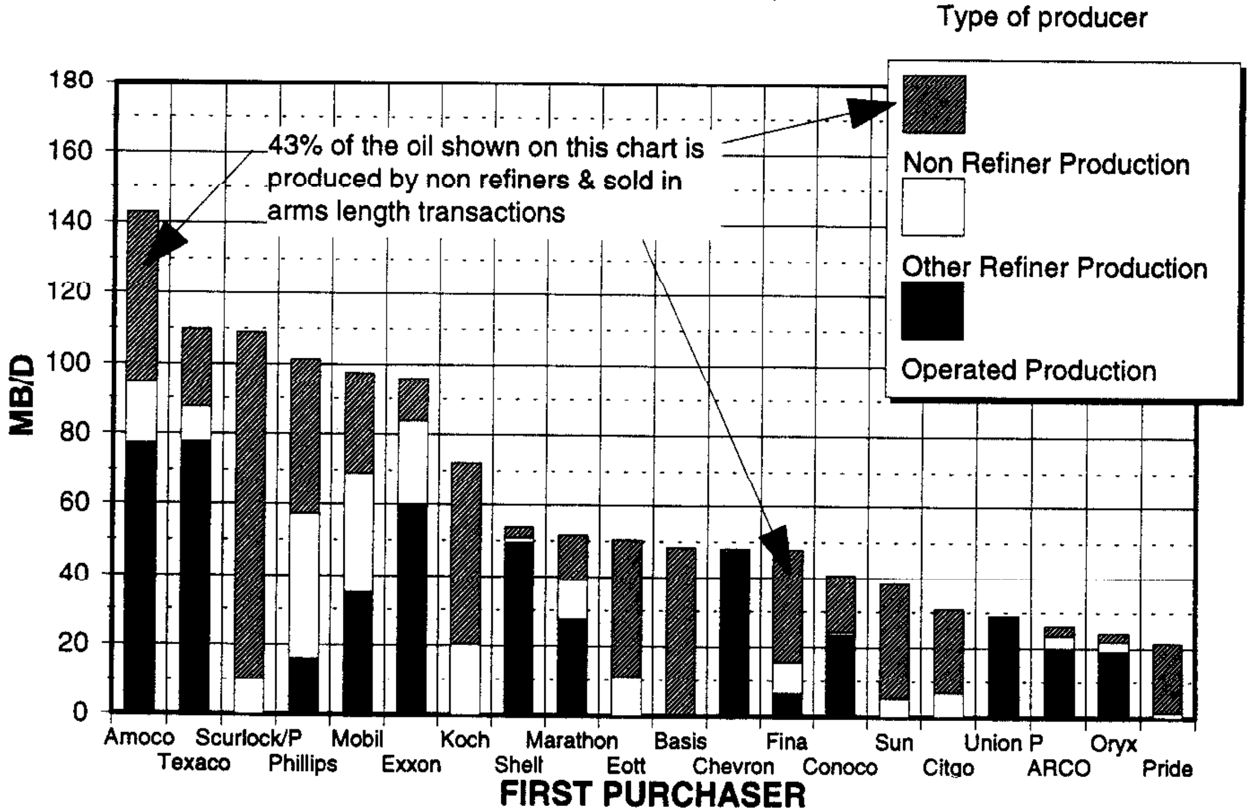
Class	MB/D	%
Operated & Affiliated Production	489.1	39.4
Other Refiner Production	211.9	17.1
Non-Refiner Production	538.7	43.5
	1,239.7	100.0

As can be noted from Figure C, these Twenty Purchasers were mainly comprised of refiners and the large truckers/resellers. Their purchases from non-refiners can also be used as an indication of the extent (43.5%) of transactions in the state between parties with opposing economic interests.

FIGURE C

TOP TWENTY FIRST PURCHASERS IN TEXAS

DECEMBER 1995



Observations

- Of the 6,214 producers in the State during 1995, only thirty-three are refiners or affiliates of refiners. Refiners and their affiliates accounted for slightly less than one-half of the oil produced in Texas during December 1995. There are over six-thousand producers which must either sell their oil at the lease (most do) or retain ownership and move their oil to a downstream market.

- In December 1995, there were one hundred fifty active First Purchasers at the lease. Of this total, forty-one were refiners and/or affiliates while the remainder were comprised of:

  - reseller/truckers, e.g., Lantern Petroleum
  - trading companies, e.g., Northridge Energy
  - producing companies, e.g., Santa Fe Energy Resources

- Refiners and their affiliates bought at the lease 1,231 MB/D or 83% of the total oil purchased in the State. About 57% of this oil represented their own (collective) production, but the remaining 43% came from non-refiners. This amounted to 534 MB/D and over eight-thousand line items. Since each of these line items may represent multiple lease transactions, this represents a huge amount of clearly arm's-length commercial dealings spread throughout the state.

- Buying crude at the lease is not limited to refiners. For example, in December 1995 there were one hundred nine non-refiner First Purchasers who purchased 254 MB/D at the lease.

- There is a small amount of refiner production, 21 MB/D spread over ninety line items, being purchased by non-refiners.

- Of the 6,000 non-refiner producers in the state, only 39 elected to retain their own oil for resale in downstream markets. Only 3 or the 39 are of any size as shown in Table 5. The 62.2 MB/D figure is equivalent to only 4.2% of the State's total for the month.

Conclusions

- Adding the arm's-length transactions together indicates that about one-half (actually 49%) of the crude oil market at the lease is between companies in which at least one of the parties is not affiliated with any refiner. This market is quite large in absolute terms, i.e., 726 MB/D and involves over 11, 000 line item entries in the First Purchaser database maintained by the State of Texas for a typical month.

- Analysis of the activity of the Top Twenty First Purchasers in December 1995 reinforces the conclusion that about one-half of the oil in Texas is sold at the lease in transactions in which at least one of the parties is not affiliated with any refiner.

- The data clearly show a viable market at the lease where there are thousands of examples of arm's-length lease transactions throughout the State which could serve as realistic indicators of market value at the lease.

Section 5

FIFTH JUDICIAL DISTRICT COURT
COUNTY OF CHAVES
STATE OF NEW MEXICO
Case Number CV-95-322

CARL ENGWALL, as Co-Trustee of the Carl and Ruth Engwall Living Trust et al.,

Plaintiffs,

vs.

AMERADA HESS CORPORATION, et al.,

Defendants.

TRANSCRIPT OF PROCEEDINGS

Volume 1

On the 13th day of January, 1997, at 9:20 AM, this matter came on for hearing before the HONORABLE ALVIN F. JONES, Judge of the Fifth Judicial District, State of New Mexico, Division II, in Roswell, New Mexico.

J. BENJAMIN JOHNSON, JR.,

after having been first duly sworn under oath,
was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. EAVES:

Q. Mr. Johnson, would you state your full name?

A. Joseph Benjamin Johnson, Jr.

Q. By whom are you employed, sir?

A. Summit Resource Management, Inc.

Q. Can you tell the Court what the business of Summit Resource Management, Inc., is?

A. Summit is a crude oil marketing and consulting firm. We market crude oil for independent producers, royalty owners, and consult regarding crude oil marketing issues.

Q. Would you briefly --

MR. EAVES: Your Honor, we are going to be talking about matters that appear in plaintiffs' Exhibit 193. We have placed for Your Honor copies of the exhibits.

Would you like for me to have one of my people turn it to 193?

THE COURT: No. I will find it.

MR. EAVES: Volume 5, I am told, Your Honor.

actual proceeds, if that is available. If not, you'd move to a comparable-type -- comparable comparison. Then the last would be a net-back-type calculation.

Q. The net-back method -- was the Piney Woods case a class action?

A. Yes, I believe it was.

Q. The net-back method that is endorsed in the Piney Woods opinions, there was more than one, is that the same net-back method that Mr. Hensley was talking about yesterday?

A. Well, I am not sure what net-back method Mr. Hensley was referring to yesterday.

Q. I am not either, so that is an unfair question. You also mentioned a method that you recommended to the Minerals Management Service as another alternative. Can you tell me what that method is?

A. The method suggested or recommended to the Minerals Management Service begins with an evaluation of what was actually received for the oil. If we have records by the oil companies that show what they actually got for it, if they really sold the oil outright in an arm's-length final sale with no other consideration, then that was -- that would be a value that would be used.

If they entered into a buy-sell transaction where oil, as I have shown this morning where oil was exchanged for oil at another location, then we can ascertain from that simple calculation what real value was provided at the lease under that buy-sell transaction, so those are actuals. If we didn't have any of those actual transactions, in other words, if, in fact, the oil company took the oil in their own pipelines, took it to their own refinery, and it never entered the marketplace at any point, then we can use a comparable analysis to look at other nearby locations whereby we look at the buy-sell transactions that were employed by the defendants or by other companies of similar sophistication.

Then the final method is, if there are none of those, if there are no buy-sell transactions available, then the last would be a methodology, a net-back type methodology to be administered by the Minerals Management Service.

Q. Are you generally aware of the Common Purchaser Statute in New Mexico?

A. Yes.

Q. Would the Common Purchaser Statute provide any methodology that might be useful as a possible method of accomplishing a damage calculation if this

Section 6

FIFTH JUDICIAL DISTRICT COURT
COUNTY OF CHAVES
STATE OF NEW MEXICO
Case Number CV-95-322

CARL ENGWALL, as Co-Trustee of the"
Carl and Ruth Engwall Living Trust
et al.,"

Plaintiffs,"

vs.

AMERADA HESS CORPORATION, et al.,"

Defendants.

TRANSCRIPT OF PROCEEDINGS

Volume 5

On the 17th day of January, 1997, at 8:30 AM," this matter came on for hearing before the HONORABLE ALVIN F. JONES, Judge of the Fifth Judicial District," State of New Mexico, Division II, in Roswell, New" Mexico.

THE COURT: I prefer to deal it when we get to it.

MR. EAVES: Thank you.

MR. ZOTT: In that regard, the plaintiffs did file a motion, and we worked last night to file a response. I know you have plenty to read, and you don't need to read anything else, but I would like to at least tender it and make it part of the record. This is our response to the written motion. I can hand it up now or wait and do it later.

THE COURT: Have you submitted it to the clerk?

MR. ZOTT: No. We are going to file it as soon as we hand it up here.

THE COURT: I left the copy that I was thoughtfully provided by Mr. Eaves in my office.

MR. EAVES: I have got another one, Your Honor.

THE COURT: Oh, thanks.

MR. EAVES: I detect that was less than sincere, Your Honor.

MR. ZOTT: Should we proceed with the examination?

THE COURT: Please.

JOSEPH P. KALT

after having been first duly sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. ZOTT:

Q. Can you please state your name and spell your last name.

A. Joseph P. Kalt, K-A-L-T.

Q. Where are you employed?

A. I am employed at Harvard University, Kennedy School of Government, and at the Economics Resource Group.

Q. Can you tell the Court what the Economic Resource Group is?

A. Economic Resource Group is a consulting firm made up, in terms of its principals, of Ph.D. economists specializing in the economics of competition, antitrust, regulation, with particular emphasis in the energy industry.

Q. Can you please describe your educational background for the Court?

A. Yes. After growing up and graduating from high school in Tucson, I went on to Stanford University where I got my bachelor's degree in economics, and then following that, went on and got my

master's and doctorate degrees in economics at the University of California at Los Angeles.

Q. You mentioned you are a --

MR. EAVES: Your Honor, if it will save time, we know he is a good economist, so I don't --

THE COURT: Do you want to present --

MR. ZOTT: We will be brief, Your Honor.

THE COURT: That is fine.

Q. (BY MR. ZOTT) You mentioned you were a professor at Harvard.

A. Yes.

Q. Can you tell the Court -- briefly describe your career as a professor at Harvard.

A. Sure. After leaving UCLA, I joined Harvard University in the Department of Economics as a nontenured faculty member, assistant and associate professor. In 1985, I took tenure at the John F. Kennedy School of Government, which is Harvard's professional school in public policy and management, and have served as full professor at the Kennedy School since 1986.

Q. Have you held any administrative positions at Harvard?

A. Yes. At the Kennedy School, I have been the academic dean for research, chairman of degree

programs, chairman of the Ph.D. program, and I am currently the chair of the economics and methods program at the school.

Q. Have you specialized at all while you have been a professor at Harvard?

A. Yes. I have specialized throughout my career. I am what is known in economics jargon as an industry organization economist studying issues of competition, antitrust, regulation, in my case, with particular emphasis on natural resource industries and other regulated industries in particular, the oil and gas industry.

Q. How about your teaching responsibilities at Harvard, can you briefly describe those?

A. Sure. When I was in the Harvard Economics Department up until 1986, I had primary responsibility for teaching the graduate and undergraduate courses in antitrust and regulation along with basic microeconomics. At the Kennedy School, I have had responsibility of teaching, again at the graduate level here at the Kennedy School, antitrust and regulation, energy -- environment energy and natural resource courses, as well as various courses in basic microeconomics and economic theory.

Q. Did those energy courses also include the

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function in the industry. It's a significant source of capital to the production level of the industry. It's also a mechanism by which producers – producers and refiners that are vertically integrated match production to refinery needs, and we see it throughout industry in the United States and elsewhere.

Vertical integration is quite common, and the fact that people use their own crude oil should be expected.

Q. Finally, what I'd like to do now is turn to where we, I guess, began today. We're a little out of order given the transactional database issues, and maybe I'll let you handle these instead of me.

I think where we were is we were on opinion number two. We've already talked about your first conclusion with respect to the proper method of valuing crude oil at the lease uses arm's-length comparable transactions at the lease.

Then I think you referred to having a hypothesis that comparable transactions at the lease demonstrate the influence of highly localized supply and demand factors.

Can you tell the Court the nature of that conclusion, and then we can move into the supporting foundation for it?

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A. Yes. Your Honor, as I indicated, I began with a hypothesis that it was possible that supply and demand factors varied from lease-to-lease and from transaction-to-transaction; and that, given the economics of supply and demand, with those factors varying, then it was then possible that those supply and demand factors would be reflected as a range, rather than a common price, for all arm's-length comparable transactions at the lease.

Plaintiffs' experts' proposed valuation methods cannot avoid highly localized inquiry, and what this second bullet on Tab 1-1 goes into, if you look at the data on actual arm's-length comparable transactions, you do indeed find that those transactions at the lease demonstrate the influence of highly localized supply and demand factors, and in a quite substantial way -- that is, in magnitudes that matter.

THE COURT: We're going to take about ten minutes at this time.

MR. ZOTT. Thank you, Your Honor.

(Recess held.)

THE COURT: Be seated.

MR. ZOTT: Proceed?

THE COURT: Please.

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MR. ZOTT: Thank you, Your Honor.

Q. (BY MR. ZOTT) Professor Kalt, I think we were talking about your second conclusion in testing your hypothesis with respect to your arm's-length comparable transaction database –

A. Yes.

Q. – that you developed.

A. Yes.

Q. We're now on Tab 2-5, Your Honor.

What do arm's-length transactions in the field reveal? Let me start with that question.

A. Well, I've tried to set forth, in Tab 2-5, three findings that can be drawn from looking at arm's-length transactions in the field.

First, when you look at how the market speaks at the field level, market valuation in actual transactions varies significantly with supply and demand factors specific to particular leases, crude oils, and transactions.

That's the point I've made, that there is substantial variation in where the market is setting prices.

Secondly, if you wanted to understand why a particular transaction at a particular locale had the market value it did, you have to have information to

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understand it and would need to know what factors were going into that transaction; and that is, as I say, whether or not a specific transaction reflects market value at the lease can only be determined by examining the attributes of that transaction.

And then, thirdly, I find that market valuation in actual transactions typically spans the range of posted prices; and, in general, we find that the lower posters have prices which are in the range of the actual market transactions going on – going on at the lease.

Q. These are the outright – I think I've been amplified – these are the outright arm's-length transactions that are in your database?

A. Yes. Each of these conclusions will be founded – not entirely, but to a very large extent – on the result of looking at the transactions database.

Q. Why don't we turn to your first conclusion, that market valuation varies significantly with supply and demand factors specific to particular leases, et cetera.

I take it we're now on Tab 2-6?

A. Yes.

THE COURT: I have a question. In your

Royalties type of property or a Penroc property.
Q. Okay. Let's turn to Tab 3-2 and start with your first subcategory, and that is the inability of the plaintiffs' valuation methods to capture field-level supply and demand factors.
A. Sure. In addition to what I just said, Your Honor, what I've done on Tab 3-2 is take the plaintiffs' screening methodology and apply it to the data for Vacuum.
This screening methodology begins with a P plus trade center price at Cushing, and then --
Q. Whose screening methodology is this?
A. This is applied by -- I've used all the data from Mr. Johnson's reports.
Q. Okay.
A. And it's basically P plus, minus the transaction adjustment, which I believe is 55 cents in the screening methodology.
I've used this to show -- then I've graphed on the graph the results of the screening methodology as the zero line and shown the deviations in Vacuum and the actual level of prices as the individual dots on the graph.
Q. Okay.
A. Okay.

Q. So the zero line would be the net-back value under this screening study that Mr. Johnson performed?
A. That's correct.
Q. Okay. And then the dots are the same basic dots we saw before?
A. But now adjusted to be different from the screening methodology.
Q. What does this tell you?
A. As you can see in this methodology, this kind of methodology, which is akin, for example, to what I understand would be applied to internal transfers, it just doesn't pick up the variation in the field-level value.
Also, really going to some extent to my second conclusion about the wrong level of commerce, you tend to produce a line which is higher -- but not always - which is higher than the general preponderance of the actual transactions occurring here; and for the reasons that I've argued before with respect to the marketing value added by the -- that's seen in the behavior of the unintegrated marketers, I think the reason this line is turning out higher than the preponderance of the dots -- that is, the preponderance of where the market speaks -- is because it has not accurately netted out the marketing value

added under the net-back methodology that their screening method applies.
Q. This is the dot that you're talking about?
A. Yes.
Q. Now, I would predict that Mr. Johnson would say, "Well, wait a minute now, even you admit, Professor, that I can adjust for gravity and I can adjust for sulfur and I can adjust for timing, and you're just using my screening number, but I can make a lot more adjustments and make it a lot more accurate."
Would that solve the problem?
A. No. As we saw in the Tab 2-10, there remains, at least in Vacuum, roughly 40 cents to a dollar variation in the value of crude oil as revealed by outright arm's-length comparable transactions reflective of the particular supply and demand valuation of that properties and that transactions attributes, and this kind of methodology would not pick up that variation.
I think it would lead to the same kinds of issues that you and I talked about a minute ago, some parties may have Beverly Hills, even after that method, and other parties may not.
Q. Now, to give it some context, that 40 cents

to a dollar, in the context of this dispute between the parties, is that a significant number?
A. Well, yes, it is.
Q. We're skipping ahead, right?
A. Yes, you are.
Q. Let me skip ahead and then we'll come back. Why don't we --
A. Just --
Q. Why don't you give me generally --
A. If you look at the screening methodologies, Your Honor, they tend to produce -- in legal terms, I think it was the damages -- the underpayment number on the order of a dollar to two dollars a barrel, and you're seeing variation here of -- some of the screenings produced like 75 cents a barrel, and even after adjusting for sulfur, gravity and timing, we still see 40 cents to a dollar variation reflective of, if you will, the not marketwide effects, like gravity and sulfur, but the highly specific effects in particular leases.
Q. Now, let's talk briefly about the wrong level of commerce. We've talked about that a lot.
I'd like to turn you to Tab 3-3. I'll put it up for you real quick here.
A. Okay.

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Q. This has been a source of discussion throughout the case.

Can you just tell the Court, very briefly, what we're seeing here?

A. What I've tried to do is provide an illustration of the kinds of sources of value added that goes on in the marketing function, whether it's vertically integrated into one of the majors or not.

What I've shown here, and I won't read through the whole thing, is the kinds of functions -- I think it was the independent marketers buying outright, turning around and taking the crude away from the lease, perhaps in a buy-sell or perhaps transporting itself, and it ranges from -- ranging for gathering and transporting, ranging for storing, either at receipt or delivery points, it involves the development of marketing and market information and expertise regarding types of crude oil as to what customers like what kinds of crude oil, how to handle transactions costs.

An important component is the assuming and managing of risk. To give you an illustration, that Falco Company that we looked at earlier, one of the independent marketers, highly sophisticated business, but bearing lots of risks, goes to Banque Paribas, a

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French bank, and will arrange 25-million-dollar financing facility to enable them to play the market, if you will, as a marketer, because they take the risk as they take title to their crude at the lease.

The importance that I drew from this, from an economic point of view, is it's a highly risky business, and that's why these people turn to these kinds of financing instruments, and the valuation of these is not used by some to sort of build up of costs, but by the marketplace. It is what the competitive marketplace tells you the value in the market of these is, the value added.

Q. So, realistically, you wouldn't be able to put a value on each one of those items and then come up with some sort of number for what the marketplace would value a particular marketer's contribution. Is that one way to say it?

A. It would be bad economics to do it line-by-line. You can look at the spread between the net-backs, if you will, that one dollar.

Q. Okay.

A. And I'm saying the dollar is not what the market reveals, but you can look at the difference between lease value and that net-back and that is giving you a measure of this factor.

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Q. When you showed the Court at the beginning of your testimony today this one dollar -- the one dollar spread that remains even after we do a net-back, is it these types of factors that you're referring to here as accounting for that?

A. Yes. If you think about it as the independent marketers -- Falco -- buying at the lease at $19, and maybe doing the kind of transaction that we've all talked about, trading it in Cushing, Oklahoma, for a crude worth $22, in addition paying the party on the other side a two-dollar differential, leaving Falco with $20, Falco has to live off of that spread of one dollar in that hypothetical.

The reason I say that the market tells us what the spread is, what the compensation is, is we know from basic economics in a competitive market, as we all acknowledge here, we have all these independent marketers competing as well with the integrated companies, and they can't survive unless they produce a value added service between the lease, $19, and the trade center net-back of $20.

Q. Now, how do the plaintiffs account for that one dollar?

A. Well, that is the -- as I understand it, in their framework with respect to buy-sells and internal

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transfers, that is the proposed mechanism for valuing what they call the proceeds from the production of the crude oil.

Q. Why don't we turn, then, to what some of the plaintiffs' experts have actually -- how they've tried to account for this dollar that we've been talking about colloquially.

First, you've got a quote from Dr. McDonald, he's the plaintiffs' economic expert whose deposition was taken, and I have a sense we're not going to be hearing from him, but why don't you tell me what he had to say about that?

A. Well, Mr. McDonald is quizzed, Tab 3-4, "Is it possible that the Kochs or Scurlocks are performing a service as a marketer and as a merchant that the market values?"

"A. That would be one explanation."

"Q. Do you have any others?"

"A. No."

Q. How about Mr. Johnson, what did he have to say about the marketing function that accounts for that dollar?

I think we've probably gone over this before, so we can just direct the Court -- this is Tab 3-4?

A. Sure. This has been read into the record. I think, basically, his conclusion that the spread -- the one-dollar spread in my picture there as compensation for this function, is, in fact, the result of incontrovertible economic reasoning about what these kinds of functions are and what the existence and survival of the independent sector of the market tells us.

Q. Okay.

A. They are at a different level of commerce than the lease.

Q. Now, I guess we're down to arbitrary selection of trade center values.

Now, you've told us a lot about the variations at the lease-level side. What can you tell us about the variations on the downstream pricing that the plaintiffs are using for their net-back methodologies?

A. Well --

Q. And we're at Tab 3-5.

A. Sure. Tab 3-5 -- what I've shown the Court here is just a graph of the differences between the NYMEX price -- NYMEX futures price and the P plus price.

Q. Why did you pick those two prices?

A. Well, these are the two primary trade center values that the plaintiffs and their experts have talked about using to value crude oil received, say, on a net-back -- received back on the back end of a buy-sell, for example.

What I graphed visually, so you can get it square, is the NYMEX -- make sure I get it right, the minus P plus -- the P plus is the zero line, and what I've graphed, then, is NYMEX minus, so when you see the line up above zero, the NYMEX is above the P plus.

Q. So what does this tell you?

A. And then the vertical access is showing you the range.

Q. What does this tell you? In other words, you're taking the NYMEX futures price and comparing it to the P plus price.

A. Sure.

Q. And what do we see? You tell me.

A. The reason I prepared this is it really goes to my points three and four on Tab 3-1, this point about the noncomparable supply and demand factors and the arbitrary selection of trade center values.

First, within a theory of what an economist would think of arbitrage economics, where the supply and demand factors are common across markets, except for transportation cost differences, one would expect these two prices to, in fact, not differ.

The fact that they do differ tells you -- and they are quite -- in common sense -- quite efficient markets, they move very rapidly and are relatively well-organized -- indeed, the NYMEX is well organized -- and that variance is telling you even those two markets at the trade center is revealing different supply and demand factors at work.

Those supply and demand factors at work in the trade center involve the demands of parties who are not at the lease, including the parties who are there purely to trade risk, and that's part of what I meant by noncomparable supply and demand.

Secondly, in the fourth bullet up there, this leads within that framework of the plaintiffs to an arbitrary selection as to trade center value, for example, for valuing internally transferred crude, if that's the proposed methodology, because presumably the parties trading P plus and NYMEX, and both doing business as well as they can, and the importance of it is that there is so much variation, that depending on whether you picked the NYMEX or the P plus, you know, you use that as a damage calculation, and then that

methodology, because it's at the wrong level of commerce with incomparable supply and demand factors relative to the lease on a -- it swings enough, depending on what you pick, you could find gross underpayment or gross overpayment.

Q. Now, the plaintiffs actually prepared some charts they may show you on cross which indicate over the long haul that these differences between these trade centers, like the NYMEX and the futures and the P plus -- if you take a five-year span, the differences are not that significant.

Would you agree with that over that long haul?

A. I would not at all be surprised, over the long haul, that these two might be quite close together.

Q. Let me just hand you -- from the plaintiffs' report, I'll hand you Exhibit GG. Now, this is an exhibit from Mr. Johnson's -- we know of his reports showing -- comparing P plus to the NYMEX average monthly prices, and then you'll see the yearly figures there.

A. Yes.

Q. Okay. Now, even for a whole year, what does this tell you, if you take these prices and compare

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them over the full year?
A. Well, if you look at the differences that are sustained over a year and get yearly averages, you find sustained values of fairly large amounts and sustained runs over multiple years for these -- where these two prices -- the NYMEX and the P plus are not running together.
I did the calculations and didn't write them down.
Q. I did.
A. Okay.
Q. I wrote them down.
A. It's faster if you did.
Q. I wrote them down.
A. And I verified them.
Q. Here we go. Can you see it?
A. Yes.
So what you see here is that in 1990, the NYMEX is above the -- I'm sorry, is below the P plus by about 72 cents a barrel, and then the NYMEX stays above for three consecutive years the P plus, 68 cents, 10 cents, 81 cents, over '91, '92 and '93, and then they switch again and the P plus is higher than the NYMEX by 31 cents.
Q. Okay. Now, before we get to the

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significance of that to this case, let me ask you, we're now comparing basically, as I understand it, two prices for delivery at Cushing, Oklahoma.
A. Yes, that's correct.
Q. Are there also -- what do you observe if you compare market trading centers?
We've heard a lot about Midland and we've heard a lot about Cushing. What happens if you look between trade centers rather than at the same trade center?
A. Sure. If you look at Tab 3-6 -- I don't think I prepared a big board on this -- but you'll see a comparison of the Midland and Cushing WTI spot prices.
Q. Okay. What is that, then? What are those prices? Just describe what we're talking about.
A. Sure. What you're seeing here is the Midland minus Cushing difference on the Platt's reported WTI spot. It's a difference.
So the vertical axis is showing you the delta between them over the period January of 1988 to January of 1996.
Again, in this case, you see across trade centers that the selection of prices shows the same kind of volatility and sustained differences over

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sustained periods of time.
Also note that in this figure that were these two trade centers reflecting the same supply and demand conditions -- in other words, if you didn't have to look any farther than trade centers to pick up the localized supply and demand forces, one would have anticipated that these prices should only differ by the transportation cost difference between Midland and Cushing.
Q. Do they?
A. That's not a plausible consequence here. There is a positive transportation cost from Cushing -- from Midland to Cushing, and even though you might have seen some variations in the transportation cost, you've never seen them switching positive to negative, there would always be a positive difference between them.
Q. So then, I think you've made it clear, but what accounts for these differences?
A. The reasonable conclusion to be drawn is that even at trade centers one sees different localized supply and demand factors that are specific to that trade center and make it different from the trade center, and based on my evidence, also different from the supply and demand factors that one sees

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operative at the lease.
Q. Now, finally, I guess the question is, does it matter?
I mean, in terms of the quantities that we're disputing in this case, do these swings make any difference?
A. Yes. In Tab 3-7, I've done an illustration to illustrate that to the Court.
Q. Can you explain that, please?
A. Sure. What I've done in Tab 3-7 is I just took, based on the plaintiffs' screening methodology, a property at Tab 3-7 of one of the named plaintiffs, S. P. and Barbara Johnson, that occurs in Dagger Draw, and it's for the month of April of '94.
I just picked this month to show that the choice between P plus and NYMEX matters quantitatively.
Under the screening methodologies and reports that Mr. Johnson produced, this particular month showed an underpayment, under the plaintiffs' methodology, of $1.04, and that was based upon a difference between the plaintiffs' net-back on the P plus of $15.77 and a price paid to S. P. and Barbara Johnson of $14.73.
If you go back and apply a NYMEX futures

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price, what you find is the NYMEX was below the P plus at that time by $1.67, and applying the methodology, one would find a negative underpayment of 63 cents, and that's what I showed by the "(63)" on the right.

Q. I guess what we call an overpayment?

A. And then a swing in the value from underpayment to negative -- from an underpayment to overpayment, however you want to call it, a swing in the value of $1.67.

Q. And then what conclusion do you draw from that?

A. Well, it's just an illustration of what I've already said, that these two markets, P plus and NYMEX, demonstratively reflect different supply and demand forces. Those forces are not present in the lease, they are not the same ones that are present at the lease in their totality, and as a result, there is an arbitrariness in the selection of these values.

Q. Now, finally, I'd like to just ask you a couple of questions before we close out here.

First, you've talked about problems and issues with respect to the level of commerce to make sure you're at the right level of commerce, and you've talked about the demonstrable influence of local supply and demand factors.

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Is there a way to eliminate the wrong level of commerce problem and to make sure you account for those localized factors?

A. I think there is. I think one would have to go do the kind of analysis that I did and looking first at where arm's-length transactions were being struck -- that is, what the market is revealing about the value.

One would then look within that set of transactions at the attributes, was it a two-bedroom house or a three-bedroom house, was it Beverly Hills, or wherever you live in Chicago, and then one would have to analyze that relative to the particular attributes of a particular royalty owner to see whether they had a two-bedroom house or three-bedroom house, a Beverly Hills property or a Chicago property.

Q. Okay. Now, let me ask you, you -- I know you have read the complaint in this case.

A. Yes.

Q. And you're aware that the plaintiffs seek to certify a class of all royalty owners to whom the defendants have underpaid royalties or overriding royalty payments.

Given the methodology and the data and your

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findings here, could you tell the Court if there is any way to determine the value of a particular royalty owners' oil, or in the words of the complaint, whether someone has been underpaid without analyzing the specific lease-level attributes that you have described today?

A. No, I don't think so. I think, to answer that question, the evidence says that there is substantial variation in the value of particular properties and particular transactions crude oil; that in order to determine the answer to the question you've just asked, I think it would require analysis of each individual potential class member's position relative to what they were paid to determine how -- whether they were really underpaid or not.

MR. ZOTT: I have no further questions.

THE COURT: Where are we at in terms of winding up today?

Mr. Eaves?

MR. EAVES: I couldn't hear you, Your Honor. I'm sorry.

THE COURT: I was just wondering where we are in terms of concluding today.

What's your sense of the situation?

MR. EAVES: I'm sure we would all like to do

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that, Your Honor.

I guess I need to visit -- now I've heard Professor Kalt's testimony, I need to visit and see what we're going to do in response.

THE COURT: Well, okay. Let me -- we'll just break until about 1:15, and I'd like, at that point, to get some sense --

MR. ZOTT: This will be our last witness, Your Honor.

THE COURT: I'm sorry?

MR. ZOTT: As you know, this is our last witness.

THE COURT: I understand -- some sense of what's contemplated in terms of the conclusion of this proceeding.

Okay. We'll be in recess until 1:15.

(Recess held.)

Section 7

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I N D E X

WITNESS	EXAMINATION BY	PAGE
PETER K. ASHTON		
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Santa Barbara, California
Thursday, October 3, 1996
9:25 a.m.

PETER K. ASHTON
Having been sworn, testified as follows:

EXAMINATION
BY MR. PYLE:
Q. Would you state your full name for the record, please.
A. Peter K. Ashton.
Q. And what is your business address?
A. Innovation & Information Consultants, 72 Junction Square, Concord, Massachusetts.
Q. What is your position with Innovation & Information Consultants?
A. I'm president of the firm.
Q. Have you had your deposition taken before in legal proceedings?
A. Yes, I have.
Q. On how many occasions?
A. Probably on the order of a dozen or 15, something like that.

Q. Have you testified in court before?
A. Yes, I have.
Q. On how many occasions?
A. Probably about the same number. Maybe not quite as many.
Q. Just briefly, the purpose of this deposition is for me to have an opportunity to inquire about your opinions in connection with this lawsuit and the bases for those opinions, and your background.
I will be asking questions; the court reporter will take down my questions and your answers.
You are under oath. Your testimony should be as truthful and accurate as you can make it.
Do you understand that procedure?
A. Yes, I do.
Q. Once the testimony is completed, it will be transcribed into a booklet, and you will be given the booklet and allowed to review it and make corrections and additions, if you like.
However, if any corrections or additions are made, I will have the opportunity to comment and question you about those at any subsequent

are interconnections with other companies' pipelines at that point or not.
Q. The next document, PIO 07330, is a document labeled "Unocal's Outright Sales in the Santa Maria Area."
Is this a summary of all the outright sales that you were able to locate based on data that has been furnished to you?
A. Based on the document that I have referenced at the bottom of the page, yes.
Q. And that document is a document that was produced by Unocal in this case?
A. Yes.
Q. And that's a Bates stamp number?
A. Yes.
Q. The next document PIO 07331. Again, this is a summary based on the reference source document of all Unocal outright purchases in the Santa Maria area?
A. Based on the source document, yes.
Q. And the time frame that you were examining here was whatever time frame was covered in the source document?
A. I think that's generally correct. I was trying to focus on those contracts that appeared to

have been or may have been in force during the period '87 through '95.
Q. On either of the outright sales or the outright purchases, was there price data contained in the documentation that you looked at?
A. No, there was not.
Q. On Unocal's Exchanges, which is document PIO 07332, was there any price data in the exchange documentation you examined?
A. No.
Q. Then the next document, PIO 07333, is what you characterize as a "Preliminary Estimate of the Damages Suffered by Pioneer as a result of Underpricing."
That's underpricing relative to what?
A. That the so-called underpricing margin, which is the third column of the table, is the difference between my calculation of the market value for Santa Maria Valley crude, and for part of the time period the average of Unocal and Mobil posting, the remaining just the Unocal posting.
Q. Is your calculation of the market value for Santa Maria crude the market value that was actually prevailing in Santa Maria at the time?
A. I don't understand the question.

Q. Well, you did a calculation of what we have been referring to as the true market value of Santa Maria crude.
Is that the same number as the market value that was actually prevailing in Santa Maria at the time?
A. I believe it's what the market value should have been prevailing in the Santa Maria Valley.
Q. But, in fact, do you have any data that would indicate that the number that you arrived at was the market value that in fact was prevailing in Santa Maria at the time?
A. Yes. I mean, my calculation is based on that.
Q. Well, maybe we are not going in the same direction here.
Do you have any information that the number that you calculated according to this theory starting in the Alaska North Slope, that the number you -- and you made these adjustments -- do you have any information that that number is the same number that was being paid by any buyers of Santa Maria Valley crude at the time of your calculation?
A. That's a very different question.

Q. That's the question I wanted to ask.
A. That's a very different question.
As I mentioned, there is one contract that I'm knowledgeable about, which contract -- which doesn't get you all the way to my number, but gets you much closer to my number. But I think I have already testified I haven't reviewed or seen other contracts with other prices on them for crude oil bought or sold during that time period.
Now, I have already testified, remember, that there's a lot of other evidence out there that shows and would subsume in that Santa Maria Valley area crude oil.
Q. But the specific question that I attempted to ask most recently was: You are not aware as you sit here today of any facts other than that one contract that had been mentioned to you by Mr. Falkenhagen that --
A. I --
Q. Let me finish the question, though.
Because I just need to know whether -- you have got a chart here that I believe was based on your calculation of what you call the true market value.
And all I'm trying to find out is other

than the contract that you know about with Mr. Falkenhagen, are there any other contracts that you have seen in the '87 through '95 time frame that show a price paid by a buyer for Santa Maria Valley crude that is the same as this so-called true market value you have calculated?

A. I don't believe I have explicitly seen in this case other contracts of that nature. But there is a whole other body of evidence that I'm relying on that shows that this would be the true market value, and we have already talked about that.

Q. I understand that theory. But that's fine. I think you have answered the question at this point.

Your preliminary estimate of damages, document PIO 07333, has computed the underpricing margin. Where do get that data? From your previous chart using the product netback, or from some subsequent document?

A. The underpricing margin is simply the difference between the market value that I have calculated, which is shown on PIO 707355 thorough 7338, minus for the period '87 through April of '93 the average of the Unocal and Mobil posted price,

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and thereafter just the Unocal posted price, doing it as we have already discussed, two different ways in terms of the quality correction for things other than sulfur.

Q. The Pioneer production is data based on the California Conservation Commission report?

A. Yes. And I already talked about the fact that I'm anticipating getting production data that will supplant that.

Q. And turn to PIO 07335. This is the summary of your computations of what you call the true market value?

A. The market value of Santa Maria Valley crude, the two different ways that we have already discussed, yes.

Q. For any of these months on this chart which is PIO 07335 to PIO 07338, do you know if the column "SMV market value" bears any relationship to the price actually prevailing in the Santa Maria area at that time?

A. There's two parts to your question I don't understand. I don't understand what you mean by "prevailing" and I don't know what you mean by -- I'm sorry -- "bear relationship to" and then I don't know what you mean by "price prevailing."

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Q. Let me clarify the first one. Do you know -- I'll clarify them both.

"Bearing a relationship to." I guess by that I meant is it the same price or higher or lower than. And by "price prevailing" I mean the price actually being paid by buyers for crude oil in Santa Maria Valley at that time.

MR. COLTON: Objection; vague. The question is --

Q. BY MR. PYLE: Let me ask it again. It's probably just way too general.

Let me ask specifically with January '87. January '87, you have computed a Santa Maria market value according to the calculation that you have outlined and the assumptions that you have made, of $13.10.

Was that price -- do you know if that price was the same as the price being paid by buyers for Santa Maria Valley crude oil in January of 1987?

A. If you mean by "the price being paid by buyers" as reflected by the posted price, I believe the $13.10 was greater than posted price.

Q. Well, what I mean by "price paid by buyers," I mean is the price actually being paid by

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anybody who actually bought crude oil in Santa Maria Valley in January of 1987?

A. Well, we have already talked about the fact that I haven't seen those contracts, so then I guess I don't know.

Q. Okay. And your answer would likely be the same for all of these months, that you simply have not seen these contracts so you don't know whether the price being paid by buyers in any given month was the same as the price you computed here: is that right?

A. That's what I just testified to.

Let me go back and say that I do know -- I have an understanding, at least, of what Pioneer was getting paid on the basis of. And they were getting paid on the basis of either the average or the Unocal posted price. So I should amend my answer to include that.

Q. That's fine. Okay.

The document PIO 07339, which is "Production in the Santa Maria Valley Unit," is the title of it. Where was that data obtained from?

A. This data again comes from the California Conservation Committee of oil producers.

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